Government
Publications

SESSIONAL PAPERS.

VOL. XXIX.—PART VII.

THIRD SESSION EIGHTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

SESSION 1897.

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ARRANGED ALPHABETICALLY.

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Asylums, Report	10	"
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No. 2.. Public Accounts of the Province for the year 1896. Presented to the Legislature, 16th February, 1897. *Printed.*

No. 3.. Estimates for the Service of the Province until after the Estimates of the year are finally passed. Presented to the Legislature, 12th February, 1897. *Not printed.* Estimates for the year 1897. Presented to the Legislature, 17th February, 1897. *Printed.* Estimates (Supplementary) for the year 1897. Presented to the Legislature, 9th April, 1897. *Printed.* Estimates (Supplementary) for the year 1897. Presented to the Legislature, 10th April, 1897. *Not printed.*

No. 4.. Report of the Commissioner of Crown Lands for the year 1896. Presented to the Legislature, 23rd March, 1897. *Printed.*

No. 5.. Report of the Department of Immigration for the year 1896. Presented to the Legislature, 15th March, 1897. *Printed.*

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No. 6.. Report of the Inspector of Division Courts for the year 1896. Presented to the Legislature, 9th March, 1897. *Printed.*

No. 7.. Report upon the working of the Tavern and Shop Licenses Acts for the year 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 8.. Report of the Commissioner of Public Works for the year 1896. Presented to the Legislature, 26th February, 1897. *Printed.*

No. 9.. Report of the Inspector of Insurance and Registrar of Friendly Societies for the year 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

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No. 10.. Report upon the Lunatic and Idiot Asylums of the Province for the year ending 30th September, 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 11.. Report upon the Common Gaols, Prisons and Reformatories of the Province for the year ending 30th September, 1896. Presented to the Legislature, 1st March, 1897. *Printed.*

No. 12.. Report upon the Houses of Refuge, Orphan and Magdalen Asylums of the Province for the year ending 30th September, 1896. Presented to the Legislature, 9th April, 1897. *Printed.*

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No. 13.. Report upon the Hospitals of the Province for the year ending 30th September, 1896. Presented to the Legislature, 30th March, 1897. *Printed.*

No. 14.. Report upon the Institution for the Education of the Blind, Brantford, for the year ending 30th September, 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 15.. Report upon the Institution for the Deaf and Dumb, Belleville, for the year ending 30th September, 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 16.. Report under the Children's Protection Act, Ontario, for the year 1896. Presented to the Legislature, 23rd February, 1897. *Printed.*

No. 17.. Report of the Agricultural College and Experimental Farm for the year 1896. Presented to the Legislature, 18th March, 1897. *Printed.*

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No. 18.. Report of the Entomological Society of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 19.. Report of the Fruit Growers' Association of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 20.. Report of the Bee-keepers' Association of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 21.. Report of the Poultry and Pet Stock Associations of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 22.. Report of the Dairymen and Creameries' Associations of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

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No. 23.. Report of the Superintendent of Farmer's Institutes of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

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No. 25.. Regulations governing payments out of the Iron Mining Fund. Presented to the Legislature, 17th February, 1897. *Printed.*

No. 26.. Report of the Live Stock Associations of the Province for the year 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 27.. Report of the Fruit Experiment Stations of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 28.. Report of the Inspectors of Factories for the year 1896. Presented to the Legislature, 2nd April, 1897. *Printed.*

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No. 29.. Report of the Registrar-General relating to the registration of Births, Marriages and Deaths in the Province for the year 1895. Presented to the Legislature, 8th March, 1897. *Printed.*

No. 30.. Report of the Inspector of Legal Offices for the year 1896. Presented to the Legislature, 15th March, 1897. *Printed.*

No. 31.. Report of the Game and Fish Commission for the year 1896. Presented to the Legislature, 16th March, 1897. *Printed.*

No. 32.. Report of the Commissioners for Queen Victoria Niagara Falls Park for the year 1896. Presented to the Legislature, 9th March, 1897. *Printed.*

No. 33.. Report of the Bureau of Mines for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

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No. 35.. Report of the Bureau of Industries for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

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No. 36.. Report of the Clerk of Forestry for the year 1896. Presented to the Legislature, 2nd April, 1897. *Printed.*

No. 37.. Return from the Records of the several Elections to the Legislative Assembly in the Electoral Districts of the South Riding of the County of Essex, the North Riding of the County of Oxford, the North Riding of the County of York, and the South Riding of the County of Essex, since the General Election of 1894, shewing: (1) the number of votes polled for each Candidate in each Electoral District. (2) The majority whereby each successful Candidate was returned. (3) The total number of votes polled in each District. (4) The total number of votes remaining unpolled. (5) The number of names on the Voters' List in each District. (6) The number of Ballot Papers sent out, and how disposed of in each Polling Sub-division. (7) The number of Tendered Ballots sent out. (8) The population of each District as shown by the last Census. Presented to the Legislature, 15th February, 1897. *Printed.*

No. 38.. Report on Capital and Income Accounts of the Toronto University for the year ending 30th June, 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 39.. Report of the Standing Committee on Finance Toronto University, 1896-7. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 40.. Report of the Commissioners on Toll Roads. Presented to the Legislature, 11th February, 1897. *Not printed.*

No. 41.. Copy of an Order in Council directing that certain money be paid to His Honour Judge Jamieson out of the surplus Surrogate fees for the year 1895. Presented to the Legislature, 11th February, 1897. *Not printed.*

No. 42.. Report on the distribution of the Statutes for the year 1896. Presented to the Legislature 11th February, 1897. *Not printed.*

No. 43.. Copy of an Order in Council directing that certain money be paid to His Honour Judge Mosgrove out of the surplus Surrogate fees for the year 1895. Presented to the Legislature 15th February, 1897. *Not printed.*

No. 44.. Return to an Order of the House, of the 18th day of March, 1896, for a Return shewing the amount the Government obtained for timber limits sold in the Township of Oakley. The amount obtained for timber dues on the timber cut in the said Township and the amount which has been expended by the Government on the roads and bridges of the Township, and all other expenditures by the Government in or for the Township. Also, the same information as to the entire District of Muskoka. Also, the number of patents issued in the Township of Oakley and the number of present locatees who have not received patents and the number of acres thereof still the property of the Crown. Presented to the Legislature 22nd February, 1897. Mr. *Langford.* *Not printed.*

No. 45.. Detailed Statement of all Bonds and Securities recorded in the Provincial Registrar's office since the last Return submitted to the Legislative Assembly, made in accordance with the provisions of the Statute, 32 Vic., cap. 29. Presented to the Legislature 26th February, 1897. *Not printed.*

No. 46.. Regulations respecting Public and High Schools in Ontario in 1896. Presented to the Legislature 26th February, 1897. *Printed.*

No. 47.. Copy of an Order in Council appointing certain persons Members of the Educational Council. Presented to the Legislature 26th February, 1897. *Not printed.*

No. 48.. Statement of the affairs of the Toronto General Trusts Company for the year 1896. Presented to the Legislature 26th February, 1897. *Not printed.*

No. 49.. Statement shewing Railways in the Province which have received Provincial aid up to 31st December, 1896. Presented to the Legislature 2nd March, 1897. *Printed.*

No. 50.. Copy of an Order in Council, approved by Colonel Sir Casimir Stanislaus Gzowski, K.C.M.G., Administrator of the Government of the Province, on the 19th day of February, 1897, relating to a license of occupation granted to Colonel Engledue of Byfleet, Surrey, England, and his associates, covering certain locations in the District of Rainy River. Presented to the Legislature 15th and 16th March, 1897. *Printed.*

No. 51.. Report of the Master of Titles for the year 1896. Presented to the Legislature 15th March, 1897. *Printed.*

No. 52.. Return to an Order of the House of the 26th day of February, 1897, for a Return giving a summarized statement of the amounts paid by the Government of Ontario in connection with the Dominion-Provincial Arbitration, and to whom, year by year. Presented to the Legislature 15th March, 1897. Mr. *Whitney. Not printed.*

No. 53.. Return to an Order of the House of the nineteenth day of February, 1896, for a Return, shewing the names of all persons, firms or companies indebted to the Province, since the date of the last Return made to this House, on account of timber dues, ground rent or bonuses for timber limits; the amount of indebtedness in each case; the balance, if any, due by such persons, firms or companies at the date of last Return, and the total amount of such indebtedness on the first day of January, 1896. Presented to the Legislature, 15th March, 1897. Mr. *Marter. Not printed.*

No. 54.. Analysis of Reports of Electoral District, Township Agricultural and Horticultural Societies. Presented to the Legislature, 15th March, 1897. *Not printed.*

No. 55.. Return to an Order of the House of the eighth day of March, 1897, for a Return shewing what was the amount of stock on hand in the Central Prison Industries on the 30th September in each of the years 1891, 1892, 1893, 1894, 1895 and 1896. Also, what was the amount of the outstanding account in connection with the Central Prison Industries on the 30th September in each of the above years. Shewing also, what was the amount of the net revenue from the Central Prison Industries on the 30th September in each of the above years. Presented to the Legislature, 15th March, 1897. Mr. *Marter*. *Not printed.*

No. 56.. Report on the House of Refuge for the County of Huron for the year 1896. Presented to the Legislature, 23rd March, 1897. *Not printed.*

No 57.. Report on the House of Refuge for the County of Waterloo for the year 1896. Presented to the Legislature, 23rd March, 1897. *Not printed.*

No. 58... Return to an Order of the House of the fifth day of March, 1897, for a Return of copies of the Minutes of meetings of the new Educational Council since its establishment, together with copies of all correspondence between the Minister of Education and the Council. Presented to the Legislature, 23rd March, 1897. Mr. *Whitney*. *Not printed.*

No. 59.. Return to an Order of the House of the tenth day of March, 1897, for a Return shewing the names, occupations and dates of appointment of the issuers of Marriage Licenses made during the years 1894, 1895 and 1896. Also, the number of Marriage Licenses issued in the years 1894, 1595 and 1896, and the amounts received by the Province from this source of income. Presented to the Legislature, 25th March, 1897. Mr. *Ryerson*. *Not printed.*

No. 60.. Return to an Order of the House of the twenty-fourth day of February, 1897, for a Return shewing the number of Pupils at each High School and Collegiate Institute, who passed, for the first time, the Primary Examination in July last. And shewing in the case of each High School and Collegiate Institute, the average length of time these candidates had attended, prior to so passing. Presented to the Legislature, 26th March, 1897. Mr. *Whitney*. *Printed.*

No. 61.. Report of the Inspector of Registry Offices for the year 1896. Presented to the Legislature, 30th March, 1897. *Printed.*

No. 62.. Copies of Orders in Council respecting the administration of the Game Laws. Presented to the Legislature, 30th March, 1897. *Not printed.*

No. 63.. Return to an Order of the House of the second day of April, 1896, for a Return of copies of all correspondence between the Government, or any member thereof, and any person respecting the opening of a certain letter addressed to F. R. Davidson, Burlington, by E.

Richardson, at the request of one Welsh, Emigrant Agent at the G. T. R. Station, Toronto, in the year 1895. Presented to the Legislature 30th March, 1897. Mr. *Kerns*. *Not printed.*

No. 64.. Return to an Order of the House of the seventeenth day of March, 1897, for a Return giving copies of all correspondence between any member of the Government and any officer of the Northern Exhibition held at Walkerton, relating to the withholding of money payable to prize winners. Presented to the Legislature 30th March, 1897. Mr. *Carnegie* *Not printed.*

No. 65.. Return to an Order of the House of the fifteenth day of March, 1897, for a Return of copies of any report of the Inspector of Division Courts, and all other documents in connection with the dismissal of John Dickinson, Bailiff. Also, giving the names of all applicants for the position, and copies of all correspondence regarding the same. Presented to the Legislature 31st March, 1897. Mr. *Ryerson*. *Not printed.*

No. 66.. Return to an Order of the House of the fifteenth day of March, 1897, for a Return of all correspondence between the Government, or any member of the Government, or the Chief Game Warden, and any member of the Government of the Province of Quebec, with reference to the provision of the Game Laws of the two Provinces requiring residents of each Province to take out licenses in order to enjoy the privilege of shooting in the other Province. Presented to the Legislature 31st March, 1897. Mr. *Barr*. *Not printed.*

No. 67.. Copy of an Order in-Council respecting regulations made and established under the Algonquin National Park Act. Presented to the Legislature 2nd April, 1897. *Not printed.*

No. 68.. Return to an order of the House of the thirty-first day of March, 1897, for a Return of copies of all correspondence between the Chief Game Warden and Alexander Dixon, touching the conduct of Deputy Game Warden Smith. Presented to the Legislature 5th April, 1897. Mr. *Ryerson*. *Not printed.*

No. 69.. Papers *re* application of Estate of Alexander McArthur *re* Timber Berth, Township of Lumsden. Presented to the Legislature 7th April, 1897. *Printed.*

No. 70.. Return to an Order of the House of the twenty-fourth of March, 1897, for a Return of the names of all persons or municipalities, who during the years 1890, 1891, 1892, 1893, 1894, 1895 and 1896, made application to the Government, under the Municipal Act, for an investigation into the financial condition of the municipality, and shewing how many were granted and how many refused, with the cause for refusal in each case. Presented to the Legislature 7th April, 1897. Mr. *Kerns*. *Not printed.*

No. 71.. Return to an Order of the House of the eighth day of March, 1897, for a Return from the Clerks of the Police Courts at Toronto, Hamil-

ton, London, Kingston and Ottawa, shewing 1st. The number of times the Children's Court sat from the first day of January, 1896, to the first day of January, 1897. 2nd. The number of children brought before the Court. 3rd. The ages of such children. 4th. The ages of children sent to Penetanguishene Reformatory. 5th. The ages of children sent to Industrial Schools. 6th Nationality. 7th. Religion. 8th. The nature of the offences or reasons why brought before the Court. 9th. How disposed of. 10th. Number of children who were before the Court twice, and under four times. 11th. The number before the Court four times and upwards. 12th. The highest number of times any one child was before the Court. 13th The number of parents summoned to answer for their children. 14th. The number who appeared. 15th. The Courts in which a separate calendar for juvenile offenders is kept. And shewing as well the number of children under thirteen received into the Penetanguishene Reformatory and Mercer Refuge during the last two years, and the special reasons for their receptions. Presented to the Legislature 8th April, 1897. Mr. *Howland.* *Not printed.*

No. 72.. Report of the Secretary and Registrar of the Province for the year 1896. Presented to the Legislature 9th April, 1897. *Printed.*

No. 73.. Return to an Order of the House of the twelfth day of March, 1897, for a Return of copies of all Orders-in-Council during the past year, referring to the sale of timber berths by tender rather than by public auction, and giving a statement showing the dates and the reasons for such sales: the number of square miles sold to each purchaser and the price at which the same were sold in each case. The names of each person so tendering for berths and the amount of each tender. Presented to the Legislature 10th April, 1897. Mr. *Whitney.* *Not printed.*

REPORT

OF THE

SUPERINTENDENT

OF

FARMERS' INSTITUTES

IN THE

PROVINCE OF ONTARIO.

1896-7.

(Published by the Ontario Department of Agriculture, Toronto.)

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1897.

THIRD ANNUAL REPORT

OF THE

SUPERINTENDENT OF FARMERS' INSTITUTES

OF

ONTARIO

FOR THE YEAR OF 1896-7.

To the Honorable the Minister of Agriculture :

I have the honor to submit herewith my Third Annual Report as Superintendent of Farmers' Institutes.

Your obedient servant,

F. W. HODSON.

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FARMERS' INSTITUTES OF ONTARIO.

ANNUAL REPORT OF THE SUPERINTENDENT.

Work of the Past Year.—In announcing the 12th annual series of meetings of Farmers' Institutes in Ontario it is gratifying to be able to show a substantial yearly increase in every department of the work. In almost every county the Institute meetings were better attended last season than ever before. The work of the local Institutes was carried on in a more systematic manner, and better results have been attained. In 1885, the first year of Institute work in Ontario, 12 meetings were held, and 2,808 persons attended the sessions; since then there has been a yearly increase in the number of meetings and in the attendance. Last season 659 meetings were held and 125,177 persons attended, and 3,277 addresses on agricultural topics were delivered. Many of these addresses were of great practical value. The numbers of persons who joined the various local Institutes and paid the annual membership fee, between January 1st and June 30th of this year, were 15,452. These figures show a satisfactory increase over the Institute year ending June 30th, 1896. During that season 102,461 persons attended the Institute meetings, 2,637 addresses were delivered, and the total membership was 12,384. At that time it was supposed by many that the Farmers' Institutes in this Province had reached the highest possible membership, attendance, and prosperity, but this year's results prove that great advances may yet be made. I am convinced that this work is only in its infancy, and that unthought of benefits will yet be realized.

Besides the 125,177 persons who attended the various Institute meetings during 1897, 18,050 persons visited the Ontario Agricultural College, Guelph, between the 9th and 28th of June, as excursionists from the various Institute districts. Each excursion was arranged for, and advertised and conducted by officers of a local Institute. During the month of June the time of the staff of the College was given to the visitors, and many object lessons were each day given, and all details connected therewith carefully explained. Such was the work accomplished during the past year. It is hoped the coming Institute season will be even more prosperous.

Meetings for 1898.—Great care has been exercised in planning the details in connection with each meeting and in choosing suitable speakers. There are advertised in this report 512 meetings. Last year 450 were similarly announced. Each of these meetings has been asked for by the executive officers and directors of a local Institute; in fact a number of additional meetings were desired but could not be granted, as the expense of holding those now advertised, and others which must be held this season, will consume all the funds which are at the disposal of the Superintendent.

Speakers.—The Farmers' Institute system is non-political in the strictest sense. (See Clauses 24 and 25 of the Act and Rules governing Farmers' Institutes). Persons sent as delegates, and officers and directors of Institutes, are instructed to enforce these rules to the very letter. Delegates are expected not to discuss, either directly or indirectly, political or sectarian questions while engaged as delegates, either before, after, or during the meetings. It is not necessary for them when acting as delegates even to make public their political allegiance.

The Rules and Regulations governing delegates are published in the "Institute Report" for 1895. Delegates are requested to make themselves familiar with these rules, and with the Act and Rules governing Farmers' Institutes. Above each division

is placed the name and address of each speaker who will deliver addresses in said division. When a speaker will not attend all the meetings in a division, the dates when he will commence and end are given.

The speaker's subjects are to be found on page xxv. of this report. The time required to deliver each address will vary from fifteen to thirty minutes, according to the requirements of the programme. In some cases the delegates may not be prepared to discuss the subjects the local officers deem of greatest interest. In such cases the officers should employ additional persons to deliver addresses of the character they desire. These additional speakers may, if desired, be chosen from the Reserve List published in this report or elsewhere. This list has been very carefully prepared, and the attention of Institute officers is respectfully called to it.

Many farmers look upon each delegate as a professor of the Ontario Agricultura College, or a representative of the Government. This is a mistake, and one that should be corrected. Only those who are teachers in the Ontario Agricultural College, and who go out on Institute work, are in any sense representatives of the Department and of the College. The others are practical and successful farmers, as above stated, and although they are capable, prudent and worthy men, the Department or the College is in no way responsible for their statements, nor are they responsible in any sense for the acts of either the College or the Department.

When not otherwise stated, at a one-day meeting the delegates will assist local talent during the afternoon and evening; at a two-day meeting, they will assist at an afternoon and an evening meeting the first day, and at a morning and an afternoon meeting the second day. Morning meetings should open promptly at 10.30; afternoon meetings at 1.30; evening meetings at 7.30. All meetings should be opened at the time advertised, whether the house is well filled or not. Delegates and officers are expected to carry out this provision.

Delegates are not expected to deliver more than two addresses each day, and in no case to occupy more time than is allotted to them in the programme issued by the local officers. The officers of local Institutes are expected to employ other speakers or essayists—particularly local residents who have been successful. When a popular evening programme is desirable (which is the case in many places) it should be entirely supplied by local talent. In every county in Ontario there are many young persons who could be employed to assist in such meetings, and if so engaged would, in all probability, thereafter take a keener interest in the work of Farmers' Institutes. Business and professional men and their families should not only be cordially invited to take part in these meetings and help to make them a success, but they should be urged to do so. It is reasonable to expect their assistance, for the success of all classes depends on the farmer; when he is prosperous all other classes flourish.

If, from sickness or any other cause, a delegate who is advertised in this bulletin cannot fulfil his engagements, another person, competent to discuss similar subjects, will be sent in his place; but every precaution will be taken to prevent the necessity of changes. When changes are necessary, substitutes will be chosen from among the list of Reserve Speakers to be found on page ix. of this report. Regular and supplementary speakers are sent to Institutes only on the terms set forth in clauses 26, 27 and 28 of the Act and Rules governing Farmers' Institutes.

Institute officers are urged to advertise and conduct these meetings as required by the Act and Rules. See clauses 29 to 35, inclusive, page 4 of the Secretary's Minute Book; also pages 8, 13, 14, 15 and 16 of the Annual Report of the Superintendent of Farmers' Institutes for 1895-6, a copy of which should be in the hands of each officer and director. It is a noticeable fact that the Institutes which have closely followed the rules and regulations are the most successful. In ninety-nine cases out of a hundred the success or lack of success of each local Institute depends on the officers. All Institutes are treated precisely alike by the Superintendent. The membership, the number of meetings held, and the total attendance, usually proclaim the efficiency or lack of efficiency of

the officers. The record of each local Institute is printed in the Annual Report. It is to be hoped local officers will carefully scrutinize this department.

RESERVE LIST.—Experience has proved it necessary that there be a reserved list of speakers. This year this list contains the names of some of Ontario's best known Institute workers, viz., G. C. Caston, V. Ficht, F. C. Harrison, B.S.A., E. Lick, Miss Bessie Livingstone, J. E. Meyer, Mungo McNabb, A. J. Reynolds, Mrs. M. J. Rogers, Mrs. J. L. Smith, Jos. Yuill. Mr. F. C. Harrison has been removed from a place on a regular deputation in order that he may deliver special lectures on Tuberculosis, or test herds which cannot be attended to by Lieut.-Col. McCrae. Mr. Harrison's services are available during December, January and February. Arrangements have been made with Mr. Isaac Usher and Mr. Hudson Usher to visit Institute districts, where special addresses are desired on the use of concrete in building basements, laying stable floors or making feeding troughs.

LIST OF REGULAR MEETINGS.

DIVISION 1.

Delegates.—C. A. Zavitz, B.S.A., Guelph; Robert Thompson, St. Catharines.

Durham (Town Hall)	S. Grey	January	4
Ayton (Township Hall)	do	"	5
Chesley (Town Hall)	C. Bruce	"	6
Tara (Vandusen's Hall)	W. do	"	7
Lion's Head (Orange Hall)	N. do	"	8
Stokes' Bay (School House)	N. do	"	10
Port Elgin (Town Hall)	W. do	"	12
Eden Grove (Graham's Hall)	S. do	"	13
Walkerton (Town Hall)	S. do	"	14
Clifford (Town Hall)	Union	"	15
Harriston	do	"	17
Gorrie	E. Huron	"	18
Kincardine	C. Bruce	"	19
Dungannon (Agricultural Hall)	W. Huron	"	20 and 21
Brussels (Town Hall)	E. do	"	22

DIVISION 2.

Delegates.—D. Z. Gibson, B.S.A., Willow Grove; W. C. Shearer, Bright, January 4 to 14, inclusive; T. H. Mason, Straffordville, January 14 to 22, inclusive.

Listowel	N. Perth	January	4
Milverton (Groesch)	N. do	"	5
St. Marys (Town Hall)	S. do	"	6
Thorndale (Harding Hall)	E. Middlesex	"	7
Kintore (Company's Hall)	N. Oxford	"	8
Embro (Town Hall)	N. do	"	10
Harrietsville (Oddfellows' Hall)	E. Middlesex	"	11
Coldstream (Town Hall)	N. do	"	12
Ailsa Craig (Town Hall)	N. do	"	13
Parkhill (Town Hall)	N. do	"	14
Forest (Town Hall)	E. Lambton	"	15
Brigden (Hayne's Hall)	W. do	"	17
Petrolea (Town Hall)	W. do	"	18
Alvinston (Town Hall)	E. do	"	19
Exeter (Town Hall)	S. Huron	"	20
Brucefield (Dixon's Hall)	S. do	"	21
Mitchell (Town Hall)	S. Perth	"	22

Division 3.

Delegates.—Major James Sheppard, Queenston; Duncan Anderson, Rugby.

Mt. Brydges (Township Hall)	W. Middlesex	January	4
Appin (Township Hall)	W. do	"	5
Eberts (Township Hall)	W. Kent	"	6
Belle River (Town Hall)	N. Essex	"	7
Tecumseh (St. Jean Baptist Hall)	N. do	"	8
Leamington (Town Hall)	S. do	"	10 and 11
Romney (Township Hall)	W. Kent	"	12
Blenheim (Township Hall)	E. do	"	13
Highgate (Township Hall)	E. do	"	14
Rodney (Township Hall)	W. Elgin	"	15
Dutton (Town Hall)	W. do	"	17
Shedden	W. do	"	18
Aylmer (Town Hall)	E. do	"	19 and 20
Mount Elgin (Foresters' Hall)	S. Oxford	"	21
Norwich (Town Hall)	S. do		22

Division 4.

Delegates.—H. L. Hutt, B. S. A., Guelph, January 4 to 15; D. E. Smith, B. A., Hamilton; Thomas A. Duff, Toronto; J. E. Orr, Fruitland, January 17 to 22.

Jerseyville	S. Wentworth	January	4
Stoney Creek	S. do	"	5
Smithville (Agricultural Hall)	Monck	"	6
Campden (Fry's Hall)	Lincoln	"	7
St. David's (Schoolhouse)	do	"	8
Stevensville (Public Hall)	Welland	"	10
Welland (Court House)	do	"	11
Marshville (Town Hall)	Monck	"	12
Rainham Centre (Town Hall)	Haldimand	"	13
Nanticoke (Town Hall)	do	"	14
Vittoria (Town Hall)	S. Norfolk	"	15
Langton (Town Hall)	S. do	"	17
Courtland (Town Hall)	N. do	"	18
Delhi (Opera House)	N. do	"	19
Waterford (Opera House)	N. do	"	20
Mt. Pleasant (Marquis Hall)	S. Brant	"	21
Burford	S. do	"	22

Division 5.

Delegates.—G. E. Day, B. S. A., Guelph, January 4 to 15; L. Patton, Oxford Mills Nelson Monteith, B. S. A., Stratford, January 15 to 24.

Elora (Armory)	C. Wellington	January	4
Glen Allan (Bruce Hall)	W. do	"	5
Drayton (Whyte's Hall)	W. do	"	6
Kenilworth (Township Hall)	E. do	"	7
Grand Valley (Tough's Hall)	E. do	"	8
Hillsburg (Town Hall)	C. do	"	10
Hornby (Town Hall)	Halton	"	11
Postville (Township Hall)	do	"	12
St. George (Public Library)	N. Brant	"	13 and 14
Rockton (Township Hall)	N. Wentworth	"	15
Freelton (Town Hall)	N. do	"	17
Galt (Fraser's Hall)	S. Waterloo	"	18
Guelph (City Hall)	S. Wellington	"	19 and 20
Berlin (Town Hall)	N. Waterloo	"	21
Baden (Witte's Hall)	S. do	"	22
Wellesley (Moyer's Hall)	N. do	"	24

Division 6.

Delegates.—Wm. Rennie, O.A.C., Guelph, January 4 to 15; Lieut.-Col. D. McCrae, Guelph; A. C. Hallman, New Dundee, January 17 to 21.

Owen Sound (Y. M. C. A. Hall)	N. Grey	Jan. 4
Flesherton (Town Hall)	C. do	" 5
Shelburne (Town Hall	Dufferin	" 6
Horning's Mills (Melancthon Hall)	do	" 7
Beeton (Town Hall)	S. Simcoe	" 8
Avening (School-room)	W. do	" 10
Duntroon (S. of S. Hall)	do	" 11
Meaford (Town Hall)	N. Grey	" 12
Thornbury (Town Hall)	C. do	" 13
Minesing (Workman's Hall)	C. Simcoe	" 14
Penetang (Town Hall)	do	" 15
Coldwater (Shepherd's Hall)	E. do	" 17
Orillia (Opera House)	do	" 18
Bradford (Town Hall)	S. do	" 19
Kettleby (Temperance Hall)	N. York	" 20
Aurora (Town Hall)	do	" 21

Division 7.

Delegates.—Lieut.-Col. D. McCrae, Guelph, November 30 to December 4, and December 12 to 21; Major James Sheppard, Queenston; Wm. Smith, Columbus, December 6 to 11; Miss Laura Rose, O.A.C., Guelph.

Cheltenham (Beaver Hall)	Peel	Nov. 30
Caledon, East (Hanton's Hall)	do	Dec. 1
Woodbridge (Orange Hall)	W. York	" 2
Weston (Eagle's Hall)	do	" 3
Agincourt (Temperance Hall)	E. do	" 4
Unionville (Victoria Hall)	do	" 6
Uxbridge (Market Hall)	N. Ontario	" 7
Beaverton (Alexandra Hall)	do	" 8
Lindsay (Town Hall)	W. Victoria	" 9
Bobcaygeon (Town Hall)	E. do	" 10
Fenelon Falls (Dickson's Hall)	do	" 11
Oakwood (Township Hall)	W. do	" 13
Whitby (Council Chamber)	S. Ontario	" 14
Bowmanville (Council Chamber)	W. Durham	" 15
Orono (Town Hall)	W. do	" 16
Millbrook (Town Hall)	E. do	" 17
Bethany (Town Hall)	do	" 18
Blackstock (Township Hall) Evening	W. do	" 20
Claremont (Workman's Hall)	S. Ontario	" 21

Division 8.

Delegates.—Professor H. H. Dean, B.S.A., Guelph; John McMillan, M.P. Seaforth.

Harwood	W. Northumberland	Nov. 30
Grafton	do	Dec. 1
Wooler (Town Hall)	E. do	" 2
Frankford (Sweetman's Hall)	W. Hastings	" 3
Wallbridge (Town Hall)	do	" 4
Bloomfield (Town Hall)	Prince Edward	" 6
Demorestville (Town Hall)	do	" 7
Plainfield (A. O. U. W. Hall)	E. Hastings	" 8
Shannonville (A. O. U. W. Hall)	do	" 9
Napanee (Town Hall)	Lennox	" 10
Centreville (Town Hall)	Addington	" 11
Tamworth (Town Hall)	do	" 13

Madoc (Town Hall)	N. Hastings	Dec.	14
Stirling (Whitty's Hall)	do	"	15
Warkworth (Town Hall)	E. Northumberland	"	16
Norwood (Town Hall)	E. Peterborough	"	17
Keene (Town Hall)	do	"	18
Lakefield (Council Chamber)	W. do	"	20
Peterborough (County Council Chamber)	do	"	21

DIVISION 9.

Delegates.—Andrew Elliott, Galt; John Robertson, Ingersoll.

Harrowsmith (Town Hall)	Frontenac	Dec.	1
Lansdowne (Town Hall)	S. Leeds	"	2
Westport (Town Hall)	do	"	4
Athens (Town Hall)	Brockville	"	6
Lyn (School Hall)	do	"	7
Algomquin (Temperance Hall)	S. Glenville	"	8
Cardinal (Town Hall)	do	"	9
Martintown (McIntosh Hall)	Glengarry	"	10
St. Andrews (Old Church)	Cornwall	"	11
Moulinette (Stark's Hall)	do	"	13
Osnabruck Centre (Paupst's Hall)	Stormont	"	14
Morrisburg (Music Hall)	Dundas	"	15
Iroquois (Town Hall)	do	"	16
Westbrook	Frontenac	"	17
Odessa (Town Hall)	Lennox	"	18
Emerald (Cheese Factory)	Amherst Island	"	20
Stella (Town Hall)	do	"	21

DIVISION 10.

Delegates.—T. G. Raynor, B.S.A., Rosehall; W. J. Palmer, B.S.A., Toronto.

Perth (Town Hall)	S. Lanark	Nov.	30
Smith's Falls (Town Hall)	do	Dec.	1
Merrickville (Town Hall)	N. Leeds and Grenville	"	2
Oxford Mills (Town Hall)	N. Leeds and Grenville	"	3
South Finch (Gormley's Hall)	Stormont	"	4
Monkland (Truax' Hall)	do	"	6
Glen Robertson (Johnson Hall)	Glengarry	"	7
Vankleek Hill (Town Hall)	Prescott	"	8 and 9
Russell (Town Hall)	Russell	"	10 and 11
Bell's Corners (Orange Hall)	Carleton	"	13
Galetta (Whyte's Hall)	do	"	14
Renfrew (Temperance Hall)	S. Renfrew	"	15 and 16
Bromley (Osceola Hall)	N. do	"	17
Foresters' Falls (Foresters' Hall)	do	"	18
Almonte (Town Hall)	N. Lanark	"	20
Carleton Place (Town Hall)	do	"	21

DIVISION 11

Delegates.—R. F. Holtermann, Brantford; J. B. Ewing, Dartford; Dr. Wm. Brodie, 405 Parliament St., Toronto, January 1 to 8.

Powassan	E. Parry Sound	Dec.	7
South River (Connolly's Hall)	do	"	8
Sundridge (Orange Hall)	do	"	9
Burk's Falls (Court House)	do	"	10
Magnetawan (Orange Hall)	do	"	11
Dunchurch	W. do	"	13
McKellar (Armstrong's Hall)	do	"	14
Carling (No. 2 School House)	do	"	15

Parry Sound (Juke's Hall)	W. Parry Sound	Dec.	16
Orrville (Town Hall)	do	"	17
Sprucedale	E. Parry Sound	"	18
Emsdale	do	"	20
Novar (Town Hall)	N. Muskoka	"	21
Chaffey (No. 9 School House)	do	"	22
Hillside (School House	do	"	23
Brunel (Town Hall)	do	"	27
Ravenscliffe (Patrons' Hall)	do	"	28
Stisted (Town Hall)	do	"	29
Cardwell (School House)	do	"	30
Raymond (Orange Hall)	C do	"	31
Utterson (Town Hall)	do	Jan.	1
Beatrice (Temperance Hall)	S. do	"	3
Port Carling (Victoria Hall)	Port Carling	"	4
Bardsville (School House)	S. Muskoka	"	5
Bracebridge (Town Hall)	do	"	6
Uffington (Fielding's Hall)	do	"	7
Gravenhurst (Town Hall)	do	"	8
Sault Ste. Marie (Council Chamber)	C. Algoma (Aft.)	"	11
Tarentorus (School House)	do (Ev'g)	"	11
West Korah (School House)	do (Aft.)	"	12
Base Line (School House)	do Ev'g)	"	12
McLennan (Temperance Hall)	St. Joseph Island	"	13
Richard's Landing (Brandon's Hall)	do	"	14
Jocelyn (Kent's Hall)	do	"	15
Mountain (School House)	do	"	17
Tenby Bay (School House)	do	"	18
Marksville (Town Hall)	do	"	19
Gore Bay, Kagawong, Barrie Island, Poplar, Evansville, Silver Water, Long Bay, Palmer's Settlement	W. Manitoulin	"	20 to 24
Sheguiandah, Little Current, Manitowaning, Green Bay, Mindemoya, Tehkummah, Big Lake	E. Manitoulin	"	25 to 28

SUPPLEMENTARY MEETINGS.

Division 1.

Delegates.—Major James Sheppard, Queenston; Jos. E. Gould, Uxbridge.

Holstein (Temperance Hall)	S. Grey	Feb.	2
Lakelet (Temperance Hall)	Union	"	3
Mildmay (Township Hall)	do	"	4
Hepworth (School House)	N. Bruce	"	5
Mar (School House)	do	"	7
Wiarton (Robinson Hall)	do	"	8
Park Head	W. do	"	9
Allenford (Orange Hall)	do	"	10
Burgoyne (Hartley's Hall)	do	"	11
Southampton (Town Hall)	do	"	12
Cassidy's School House	do	"	14
Ribey's School House	do	"	15
Underwood (Township Hall)	do	"	16
McGregor's School House	do	"	17
Gilchrist's School House	do	"	18
Tiverton (Town Hall)	do	"	19
Paisley (Town Hall)	C. Bruce	"	21
Chepstowe (Hartleib's Hall)	do	"	22

Ripley (Town Hall)	C. Bruce		Feb.	23
Formosa (Kuhry's Hall)	S. Bruce		"	24
Kinlough (Orange Hall)	do		"	25
Bluevale	E. Huron		"	26
Ethel	do		"	28
Leadbury	do		Mar.	1
Constance	do		"	2
Holmesville (Village Hall)	W. do		"	3
Auburn (Orange Hall)	do		"	4
Wingham (Town Hall)	do		"	5

DIVISION 2.—A.

Delegates.—James McEwing, Drayton; W. J. Palmer, B.S.A., Toronto.

Lobo (Foresters' Hall)	N. Middlesex		Feb.	1
Adelaide (Town Hall)	do		"	2
Beechwood (Grange Hall)	do		"	3
Granton (Coxen's Hall)	do		"	4
Clandeboye	do		"	5
West McGillivray	do		"	7
Greenway	do		"	8
Sylvan	do		"	9
Arkona (Showler's Hall)	E. Lambton		"	10
Jura (Orange Hall)	do		"	11
Camlachie (Masonic Hall)	do		"	12
Aberarder	do		"	14
Uttoxeter (Orange Hall)	do		"	15
Warwick (Town Hall)	do		"	16
Watford (Town Hall)	do		"	17
Wanstead (Orange Hall)	do		"	18
Wyoming (Temperance Hall)	do		"	19
Inwood	do		"	21
Rutherford (Township Hall)	W. Lambton		"	22
Wilkesport (Shaw's Hall)	do		"	23
Courtright (Stewart's Hall)	do		"	24
Oil City (School House)	do		"	25
Sarnia (Township Hall)	do		"	26

DIVISION 2.—B

Delegates.—John Robertson, Ingersoll; H. Glendinning, Manilla.

Atwood (Agricultural Hall)	N. Perth		Feb.	1
Millbank (Rutherford's Hall)	do		"	2
Rostock (Wingfelder's Hall)	do		"	3
Shakespeare (Temperance Hall)	do		"	4
Wellburn	E. Middlesex		"	5
Bryanston	do		"	7
Hyde Park	do		"	8
Scottsville (Chosen Friends' Hall)	do		"	9
Hubrey	do		"	10
Dorchester Station (Town Hall)	do		"	11
Hickson (Foresters' Hall)	N. Oxford		"	12
Bright (Duncan's Hall)	do		"	14
Tavistock (Public Hall)	S. Perth		"	15
Sebringville (Foresters' Hall)	do		"	16
Monkton (Public Hall)	do		"	17
Staffa (Public Hall)	do		"	18
Kirkton (Aberdeen Hall)	do		"	19
Crediton (Township Hall)	S. Huron		"	21
Zurich (Township Hall)	do		"	22
Hensall (Coxworth's Hall)	do		"	23

Division 3.

Delegates.—Lieut.-Col. D. McCrae, Guelph; D. E. Smith, Hamilton.

Delaware (Township Hall)	W. Middlesex	Feb.	1
Strathroy (Firemen's Hall)	do	"	2
Napier (Township Hall)	do	"	3
Melbourne (Masonic Hall)	do	"	4
Glencoe (Thompson Hall)	do	"	5
Zone (Township Hall)	E. Kent	"	7
Croton	do	"	8
Thamesville (Town Hall)	do	"	9
Bridge End (Grange Hall)	do	"	10
Dover Centre (Rankin's Hall)	W. Kent	"	11
Union Hall, Raleigh	do	"	12
Ruscom (Town Hall)	N. Essex	"	14
Petite Cote (School House)	do	"	15
Amherstburg (Town Hall)	S. Essex	"	16
Harrow (Town Hall)	do	"	17
Kingsville (Town Hall)	do	"	18
Cottam (Town Hall)	do	"	19
Wheatley (Agricultural Hall)	do	"	21
Valetta (Township Hall)	W. Kent	"	22
Ridgetown (Township Hall)	E. do	"	23
West Lorne (Township Hall)	W. Elgin	"	24
Wallacetown (Township Hall)	do	"	25
Fingal (Township Hall)	do	"	26
Yarmouth Centre	E. do (Aft.)	"	28
Sparta	do (Ev'g)	"	28
Straffordville (Bayham's Hall)	do	Mar.	1
Otterville (Town Hall)	S. Oxford	"	2
Oxford Centre (Town Hall)	do	"	3
Beachville (Town Hall)	do	"	4

Division 4.

Delegates.—R. S. Stevenson, Ancaster, February 1 to 5, and 11 to 25; M. Burrell St. Catharines; D. G. Hanmer, Burford, February 7 to 10.

Ancaster (Town Hall)	S. Wentworth	Feb.	1
Mt. Hope	"	"	2
Binbrook	"	"	3
Grimsby (Town Hall)	Lincoln	"	4
Grange Hall, Louth	"	"	5
Orange Hall, Grantham	"	"	7
Niagara Falls South (Town Hall)	Welland	"	8
Willoughby (Town Hall)	"	"	9
Allanburg (Town Hall)	"	"	10
Humberstone (Town Hall)	"	"	11
Pelham Centre (Town Hall)	Monck	"	12
Attercliffe Station (Sensabaugh's Hall)	"	"	14
Dunnville (Town Hall)	"	"	15
York (Town Hall)	Haldimand	"	16
DeCewsville (Town Hall)	"	"	17
Port Dover (Town Hall)	S. Norfolk	"	18
Walsh (Town Hall)	"	"	19
Port Rowan (Masonic Hall	"	"	21
Windham Centre (Town Hall)	N. Norfolk	"	22
Bealton	"	"	23
Scotland (Foster's Hall)	S. Brant	"	24
Council House, Indian Reserve	"	"	25

DIVISION 5.

Delegates.—Thos. McMillan, Seaforth; W. W. Hilborn, Leamington.

Moorefield (Township Hall)	W.	Wellington	Feb.	1
Palmerston (Town Hall)		"	"	2
Mount Forest (Town Hall)	E.	"	"	3
Conn (Orange Hall)		"	"	4
Damascus (Township Hall)		"	"	5
Arthur (Town Hall)		"	"	7
Metz	C.	"	"	8
Ennotville (Mechanics' Institute)		"	"	9
Ospringe		"	"	10
Acton (Town Hall)	Halton		"	11
Brookville (Township Hall)	"		"	12
Kilbride (McGregor's Hall)	"		"	14
Waterdown (Township Hall)	N.	Wentworth	"	15
Mill Grove (Town Hall)		"	"	16
Kirkwall (School House)		"	"	17
Glen Morris (Township Hall)	N.	Brant	"	18
Moyle's School House		"	"	19
Onondaga (Township Hall)		"	"	21
New Hamburg (William Tell Hall)	S.	Waterloo	"	22
Philipsburg (Village Hall		"		23
Haysville (Village Hall)		"	"	24
New Dundee (Village Hall)		"	"	25
Strasburg		"	"	26
Roseville (Stuermer's Hall)		"	"	28
Ayr (McGeorge's Hall)		"	Mar.	1
Branchton (Village Hall)		"	"	2
Hespeler (Royal Templar's Hall)		"		3
Preston (Town Hall)		"	"	4
Breslau (Hotel Hall)		"		5
Conestogo (Schweitzer's Hall)	N.	"		7
Linwood (Friedman's Hall)		"	"	8

DIVISION 6.

Delegates.—J. J. Ferguson, B.S.A., Smith's Falls; James Tolton, Walkerton, February 1 to 19; T. C. Wheatley, Blackwell, February 21 to March 8.

Chatsworth (Township Hall)	N.	Grey	Feb.	1
Desborough (Township Hall)		"	"	2
Kilsyth (Township Hall)		"	"	3
S. S. No. 8 Derby		"	"	4
Kemble (School House)		"	"	5
Browne's School House		"	"	7
Leith		" (Aft.)	"	8
Annan		" (Ev'g)	"	8
Kirvan's School House		"		9
Lot 16, Con. 9, St. Vincent School House		"	"	10
Bognor		"	"	11
Walters' Falls (Oddfellows' Hall)	C.	"	"	12
Kimberley (Union Hall)		"	"	14
Priceville (Watson's Hall)		"	"	15
Feversham (Orange Hall)		"	"	16
Nottawa (Orange Hall)	W.	Simcoe	"	17
New Lowell (Town Hall)		"	"	18
Everett (Coleman's Hall)		"	"	19
Athlone (Hotel Hall)	S.	"	"	21
Ivy (Orange Hall)		"		22
Stroud (Masonic Hall)		"		23
Edenvale (Temperance Hall)	C.	"	"	24

Allenwood	C. Simcoe		Feb.	25
Wyebridge (Orange Hall)	"		"	26
Victoria Harbor	"		"	28
Medonte (Town Hall)	E. Simcoe	(Aft.)	Mar.	1
Hillsdale	"	(Ev'g)	"	1
Edgar	"	(Aft.)	"	2
Crown Hill	"	(Ev'g)	"	2
Shanty Bay (Temperance Hall)	"	(Aft.)	"	3
Hawkstone (Moor & Gardiner's Hall)	"	(Ev'g)	"	3
Uhthoff (School House)	"	(Aft.)	"	4
Ardtrea (School House)	"	(Ev'g)	"	4
Severn Bridge (Cleland's Hall)	"		"	5
Mt. Albert	N. York		"	7
Sutton	"		"	8

DIVISION 7

Delegates.—T. G. Raynor, B.S.A., Rosehall; W. S. Fraser, Bradford, January 4 to 29; G. A. Brodie, B.S.A., Bethesda, January 31 to February 7.

Bolton (Town Hall)	Peel		Jan.	4
Caledon (Township Hall)	"		"	5
Streetsville	"		"	6
Brampton (Concert Hall)	"		"	7,8
Malton (Temperance Hall)	"		"	10
Maple (Masonic Hall)	W. York		"	11
Islington (Town Hall)	"		"	12
Wexford (Methodist Hall)	"		"	13
Scarboro Junction	E. "		"	14
Goodwood (Township Hall)	N. Ontario		"	15
Zephyr (Village Hall)	"		"	17
Udora (Village Hall)	"		"	18
Sunderland (Township Hall)	"		"	19
Cannington (Village Hall)	"		"	20
Brechin (McGrath's Hall)	"		"	21
Uptergrove	"		"	22
Longford	"		"	24
Woodville (Township Hall)	W. Victoria		"	25
Hartley (Orange Hall)	"		"	26
Little Britain (Temperance Hall)	"		"	27
Valentia (Cheese Factory)	"		"	28
Port Perry (Town Hall)	S. Ontario		"	29
Greenbank (Town Hall)	"		"	31
Epsom (School House)	"		Feb.	1
Myrtle (Temperance Hall)	"		"	2
Columbus (Town Hall)	"		"	3
Oshawa (Town Hall)	"		"	4
Pickering (Dale's Hall)	"		"	5
Whitevale (Wilson's Hall)	"		"	7

DIVISION 8.

Delegates.—Prof. J. Hugo Reed, V. S., Guelph, January 4 to 22; A. McNeill, Walkerville; A. P. Ketchen, Brucefield.

Victoria Road (Music Hall)	E. Victoria		Jan.	4
Cambray (Tomlin's Hall)	"		"	5
Dunsford (Old English Church)	"		"	6
Omemee (Bradburn's Hall)	"		"	7
Bridgenorth (Township Hall)	W. Peterborough		"	8
Hall's Bridge (Orange Hall)	"		"	10
Warsaw (Agricultural Hall)	E. "		"	11
Westwood (Town Hall)	"		"	12

Turner's School House	W. Hastings	Jan.	13
Hogle's School House	"	"	14
Cherry Valley (Town Hall)	Prince Edward	"	15
Waupoos (Town Hall)	"	"	17
Milford (Town Hall)	"	"	18
Wellington (Music Hall)	"	"	19
Ameliasburg (Town Hall)	"	"	20
Consecon (Killip's Hall)	"	"	21
Brighton (Town Hall)	E. Northumberland	"	22
Castleton (Town Hall)	"	"	24
Fenella	W. "	"	25
Baltimore (Chapman's Hall)	"	"	26
Garden Hill (Orange Hall)	E. Durham	"	27
South Monaghan (Town Hall)	"	"	28
Lifford (Town Hall)	"	"	29
Blackstock (Town Hall)	W. "	"	31
Hayden (School House)	" (Aft.)	Feb.	1
Tyrone (Son's Hall)	" (Ev'g)	"	1
Solina (Son's Hall)	" (Aft.)	"	2
Mount Carswell (Son's Hall)	" (Ev'g)	"	2
Orono (Town Hall)	" (Aft.)	"	3
Newcastle (Town Hall)	" (Ev'g)	"	3
Newtonville (Orange Hall)	" (Aft.)	"	4
Kendall (Orange Hall)	" (Ev'g)	"	4

N. B.—The dates of Supplementary Meetings in North Hastings will be announced at a later date. The delegates will be Alex. McLean, Carleton Place, and J. G. Foster, Moira.

Division 9.

Delegates.—Alf. Brown, Picton, January 4 to 20; A. W. Peart, Burlington, January 20 to February 4; Simpson Rennie, Milliken, January 4 to 20: Wm. Linton, Aurora, January 20th February 4.

Tweed (Town Hall)	E. Hastings	Jan.	4
Enterprise (Village Hall)	Addington	"	5
Centerville (Town Hall)	"	"	6
Newburgh (Finkle's Hall)	"	"	7
Deseronto	E. Hastings	"	8
Roblin (Town Hall)	Lennox	"	10
Selby (Town Hall)	"	"	11
Sillsville (Town Hall)	"	"	12
Adolphustown (Town Hall)	"	"	13
Bath (Town Hall)	"	"	14
Kingston (Court House)	Frontenac	"	15
Joyceville	"	"	17
Seeley's Bay	South Leeds	"	18
Newboro (Town Hall)	"	"	19
Delta (Town Hall)	"	"	20
Addison (Ashwood Hall)	Brockville	"	21
Mallorytown (Oddfellows' Hall)	"	"	22
Fairfield East (Foresters' Hall)	"	"	24
North Augusta (Pardee's Hall)	S. Grenville	"	25
Spencerville (Town Hall)	"	"	26
Maxville (Public Hall)	Glengarry	"	27
Dalkeith (Public School)	"	"	28
Curry Hill (Public School)	"	"	29
Pic-nic Grove (Public School)	"	"	31
South Branch (Patrons' Hall)	Cornwall	Feb.	1
Harrison's Corners (School-house)	"	"	2
Emerald (Cheese Factory)	Amherst Island	"	3
Stella (Town Hall)	"	"	4

DIVISION 10.

Delegates.—H. Glendinning, Manilla, January 4 to 29, inclusive; R. Honey, Brickley, January 22 to February 5, inclusive; John Robertson, Ingersoll, January 4 to 22, inclusive; Arthur Johnston, Greenwood, January 31 to February 5, inclusive.

Maberly (Town Hall)	S. Lanark	Jan.	4
Fallbrook (Fummerton's Hall)	"	"	5
Balderson (School House)	"	"	6
Franktown (School House)	"	"	7
Lombardy (Town Hall)	"	"	8
Frankville (School House)	N. Leeds, N. Grenville	"	10
Easton's Corners (Town Hall)	"	"	11
Carley's Corners (Orange Hall)	"	"	12
Bishop's Mills (Temperance Hall)	"	"	12
Burritt's Rapids (School House)	"	"	14
Kemptville (Town Hall)	"	"	15
South Mountain	Dundas	"	17
Winchester	"	"	18
Crysler (Currie's Hall)	Stormont	"	19
Newington (McAvoy's Hall)	"	"	20
Avonmore	"	"	21
Fournier (McGregor's Hall)	Prescott	"	22
Casselman (Town Hall)	Russell	"	24
Kenmore (Foresters' Hall)	"	"	25
Manotick (Harmony Hall)	Carleton	"	26
North Gower (Town Hall)	"	"	27
Eganville (Town Hall)	S. Renfrew	"	29
Calabogie (Town Hall)	"	"	31
Stewartville (Town Hall)	"	Feb.	1
Pakenham (Oddfellows' Hall)	"	"	2
Lanark (Town Hall)	"	"	3
Watson's Corners	"	"	4
McDonald's Corners	"	"	5

ALPHABETICAL LIST OF INSTITUTES WITH PLACES AND DATES OF MEETINGS.

The number printed after each place of meeting indicates the Division to which that meeting belongs. Meetings in Divisions 7, 8, 9, 10 and 11 will, when held in December, be Regular Meetings, and when held in January be Supplementary Meetings; but no Supplementary Meetings will be held for Division 11. Meetings in Divisions 1, 2, 3, 4, 5, 6 will, when held in January, be Regular Meetings and when held in February be Supplementary Meetings.

ADDINGTON—		
Centreville, 8	December	11
Tamworth, 8	"	13
Enterprise, 9	January	5
Centreville, 9	"	6
Newburgh, 9	"	7
ALGOMA CENTRE—		
Sault Ste. Marie, 11	January	11
Tarantorus, 11	"	11
West Korah, 11	"	12
Base Line, 11	"	12
AMHERST ISLAND—		
Emerald, 9	December	20
Stella, 9	"	21
Emerald, 9	February	3
Stella, 9	"	4
BRANT, NORTH—		
St. George, 5	Jan.	13, 14
Glen Morris, 5	February	18
Moyle's School House, 5	"	19
Onondaga, 5	"	21
BRANT, SOUTH—		
Mount Pleasant, 4	January	21
Burford, 4	"	22
Scotland, 4	February	24
Indian Reserve, 4	"	25
BROCKVILLE—		
Athens, 9	December	6
Lyn, 9	"	7
Addison, 9	January	21
Mallorytown, 9	"	22
Fairfield East, 9	"	24

BRUCE CENTRE—
Chesley, 1 ..... January 6
Kincardine, 1 ..... " 19
Paisley, 1 ..... February 21
Chepstowe, 1 ..... " 22
Ripley, 1 ..... " 23

BRUCE, NORTH—
Lion's Head, 1 ..... January 8
Stokes Bay, 1 ..... " 10
Hepworth, 1 ..... February 5
Mar, 1 ..... " 7
Wiarton, 1 ..... " 8

BRUCE, SOUTH—
Eden Grove, 1 ..... January 13
Walkerton, 1 ..... " 14
Formosa, 1 ..... February 24
Kinlough, 1 ..... " 25

BRUCE, WEST—
Tara, 1 ..... January 7
Port Elgin, 1 ..... " 12
Park Head, 1 ..... February 9
Allenford, 1 ..... " 10
Burgoyne, 1 ..... " 11
Southampton, 1 ..... " 12
Cassidy's Schoolhouse, 1 ... " 14
Ribey's Schoolhouse, 1 .... " 15
Underwood, 1 ..... " 16
McGregor's Schoolhouse, 1 . " 17
Gilchrist's Schoolhouse, 1 .. " 18
Tiverton, 1 ..... " 19

CARLETON—
Bell's Corners, 10 ..... December 13
Galetta, 10 ..... " 14
Manotick, 10 ..... January 26
North Gower, 10 ..... " 27

CORNWALL—
St. Andrews, 9 ..... December 11
Moulinette, 9 ..... " 13
South Branch, 9 ..... February 1
Harrison's Corners, 9 ..... " 2

DUFFERIN—
Shelburne, 6 ..... January 6
Horning's Mills, 6 ..... " 7

DUNDAS—
Morrisburg, 9 ..... December 15
Iroquois, 9 ..... " 16
South Mountain, 10 ..... January 17
Winchester, 10 ..... " 18

DURHAM, EAST—
Millbrook, 7 ..... December 17
Bethany, 7 ..... " 18
Garden Hill, 8 ..... January 27
South Monaghan, 8 ..... " 28
Lifford, 8 ..... " 29

DURHAM, WEST—
Bowmanville, 7 ..... December 15
Orono, 7 ..... " 16
Blackstock, 7 ..... " 20
Blackstock, 8 ..... January 31
Hayden, 8, afternoon ..... February 1
Tyrone, 8, evening ..... " 1
Solina, 8, afternoon ..... " 2
Mount Carswell, 8, evening. " 2
Orono, 8, afternoon ..... " 3
Newcastle, 8, evening ..... " 3

DURHAM, WEST.—*Continued.*
Newtonville, 8, afternoon .. February 4
Kendall, 8, evening ..... " 4

ELGIN, EAST—
Aylmer, 3 ..... Jan. 19, 20
Yarmouth Centre, 3 ..... February 28
Sparta, 3 ..... " 28
Straffordville, 3 ..... March 1

ELGIN, WEST—
Rodney, 3 ..... January 15
Dutton, 3 ..... " 17
Shedden, 3 ..... " 18
West Lorne, 3 ..... February 24
Wallacetown, 3 ..... " 25
Fingal, 3 ..... " 26

ESSEX, NORTH—
Belle River, 3 ..... January 7
Tecumseh, 3 ..... " 8
Ruscom, 3 ..... February 14
Petite Cote, 3 ..... " 15

ESSEX, SOUTH—
Leamington, 3 ..... Jan. 10, 11
Amherstburg, 3 ..... February 16
Harrow, 3 ..... " 17
Kingsville, 3 ..... " 18
Cottam, 3 ..... " 19
Wheatley, 3 ..... " 21

FRONTENAC—
Harrowsmith, 9 ..... December 1
Westbrook, 9 ..... " 17
Kingston, 9 ..... January 15
Joyceville, 9 ..... " 17

GLENGARRY—
Glen Robertson, 10 ..... December 7
Martintown, 9 ..... " 10
Maxville, 9 ..... January 27
Dalkeith, 9 ..... " 28
Curry Hill, 9 ..... " 29
Picnic Grove, 9 ..... " 31

GRENVILLE, SOUTH—
Algonquin, 9 ..... December 8
Cardinal, 9 ..... " 9
North Augusta, 9 ..... January 25
Spencerville, 9 ..... " 26

GREY, CENTRE—
Flesherton, 6 ..... January 5
Thornbury, 6 ..... " 13
Walter's Falls, 6 ..... February 12
Kimberley, 6 ..... " 14
Priceville, 6 ..... " 15
Feversham, 6 ..... " 16

GREY, NORTH—
Owen Sound, 6 ..... January 4
Meaford, 6 ..... " 12
Chatsworth, 6 ..... February 1
Desborough, 6 ..... " 2
Kilsyth, 6 ..... " 3
S.S. No. 8, Derby, 6 ..... " 4
Kemble, 6 ..... " 5
Browne's Schoolhouse, 6 ... " 7
Leith, 6, afternoon ..... " 8
Annan, 6, evening ..... " 8
Kirvan's Schoolhouse, 6.... " 9

GREY, NORTH.—*Continued.*
Lot 16, Con. 9, St. Vincent Schoolhouse, 6 ..... February 10
Bognor, 6 ..... " 11
GREY, SOUTH—
Durham, 1 ..... January 4
Ayton, 1 ..... " 5
Holstein, 1 ..... February 2
HALDIMAND—
Rainham Centre, 4 ..... January 13
Nanticoke, 4 ..... " 14
York, 4 ..... February 16
De Cewsville, 4 ..... " 17
HALTON—
Hornby, 5 ..... January 11
Postville, 5 ..... " 12
Acton, 5 ..... February 11
Brookville, 5 ..... " 12
Kilbride, 5 ..... " 14
HASTINGS, EAST—
Plainfield, 8 ..... December 8
Shannonville, 8 ..... " 9
Tweed, 9 ..... January 4
Deseronto, 9 ..... " 8
HASTINGS, NORTH—
Madoc, 8 ..... December 14
Stirling, 8 ..... " 15
NOTE.—Supplementary meetings will be arranged later.
HASTINGS, WEST—
Frankford, 8 ..... December 3
Wallbridge, 8 ..... " 4
Turner's School House, 8 .. January 13
Hogle's School House, 8 .... " 14
HURON, EAST—
Gorrie, 1 ..... January 18
Brussels, 1 ..... " 22
Bluevale, 1 ..... February 26
Ethel, 1 ..... " 28
Leadbury, 1 ..... March 1
Constance, 1 ..... " 2
HURON, SOUTH—
Exeter 2 ..... January 20
Brucefield, 2 ..... " 21
Crediton, 2b ..... February 21
Zurich, 2b ..... " 22
Hensall, 2b ..... " 23
HURON, WEST—
Dungannon, 1 ..... Jan. 20, 21
Holmesville, 1 ..... March 3
Auburn, 1 ..... " 4
Wingham, 1 ..... " 5
KENT, EAST—
Blenheim, 3 ..... January 13
Highgate, 3 ..... " 14
Zone, 3 ..... February 7
Croton, 3 ..... " 8
Thamesville, 3 ..... " 9
Bridge End, 3 ..... " 10
Ridgetown, 3 ..... " 23
KENT WEST—
Eberts, 3 ..... January 6
Romney, 3 ..... " 12
Dover Centre, 3 ..... February 11
Union Hall, Raleigh, 3 .... " 12
Valetta, 3 ..... " 22

LAMBTON, EAST—
Forest, 2 ..... January 15
Alvinston, 2 ..... " 19
Arkona, 2a ..... February 10
Jura, 2a ..... " 11
Camlachie, 2a ..... " 12
Aberarder, 2a ..... " 14
Uttoxeter, 2a ..... " 15
Warwick, 2a ..... " 16
Watford, 2a ..... " 17
Wanstead, 2a ..... " 18
Wyoming, 2a ..... " 19
Inwood, 2a ..... " 21
LAMBTON, WEST—
Brigden, 2 ..... January 17
Petrolea, 2 ..... " 18
Rutherford, 2a ..... February 22
Wilkesport, 2a ..... " 23
Courtright, 2a ..... " 24
Oil City, 2a ..... " 25
Sarnia, 2a ..... " 26
LANARK, NORTH—
Almonte, 10 ..... December 20
Carleton Place, 10 ..... " 21
Pakenham, 10 ..... February 2
Lanark, 10 ..... " 3
Watson's Corners, 10 ..... " 4
McDonald's Corners, 10 .... " 5
LANARK, SOUTH—
Perth, 10 ..... November 30
Smith's Falls, 10 ..... December 1
Maberly, 10 ..... January 4
Fallbrook, 10 ..... " 5
Balderson, 10 ..... " 6
Franktown, 10 ..... " 7
Lombardy, 10 ..... " 8
LEEDS, N.; GRENVILLE, N.—
Merrickville, 10 ..... December 2
Oxford Mills, 10 ..... " 3
Frankville, 10 ..... January 10
Easton's Corners, 10 ..... " 11
Carley's Corners, 10 ..... " 12
Bishop's Mills 10 ..... " 13
Burritt's Rapids, 10 ..... " 14
Kemptville, 10 ..... " 15
LEEDS, SOUTH—
Lansdowne, 9 ..... December 2
Westport, 9 ..... " 4
Seeley's Bay, 9 ..... January 18
Newboro', 9 ..... " 19
Delta, 9 ..... " 20
LENNOX—
Napanee, 8 ..... December 10
Odessa, 9 ..... " 18
Roblin, 9 ..... January 10
Selby 9 ..... " 11
Sillsville, 9 ..... " 12
Adolphustown, 9 ..... " 13
Bath, 9 ..... " 14
LINCOLN—
Campden, 4 ..... January 7
St. David's, 4 ..... " 8
Grimsby 4 ..... February 4
Grange Hall, Louth, 4 .... " 5
Orange Hall, Grantham, 4 .. " 7

MANITOULIN, WEST—		
Gore Bay, 11	January	20
Kagawong, 11		
Barrie Island, 11		
Poplar, 11		
Evansville, 11	to	
Silver Water, 11		
Long Bay, 11		
Palmer's Settlement, 11	January	24
MANITOULIN, EAST—		
Sheguiandah, 11	January	25
Little Current, 11		
Manitowaning, 11		
Green Bay, 11	to	
Mindemoya, 11		
Tehkummah, 11		
Big Lake, 11	January	28
MIDDLESEX, EAST—		
Thorndale, 2	January	7
Harrietsville, 2	"	11
Wellburn, 2b	February	5
Bryanstown, 2b	"	7
Hyde Park, 2b	"	8
Scottsville, 2b	"	9
Hubrey, 2b	"	10
Dorchester Station, 2b	"	11
MIDDLESEX, NORTH—		
Coldstream, 2	January	12
Ailsa Craig, 2	"	13
Parkhill, 2	"	14
Lobo, 2a	February	1
Adelaide, 2a	"	2
Beechwood, 2a	"	3
Granton, 2a	"	4
Clandeboye, 2a	"	5
West McGillivray, 2a	"	7
Greenway, 2a	"	8
Sylvan, 2a	"	9
MIDDLESEX, WEST—		
Mount Brydges, 3	January	4
Appin, 3	"	5
Delaware, 3	February	1
Strathroy, 3	"	2
Napier, 3	"	3
Melbourne, 3	"	4
Glencoe, 3	"	5
MONCK—		
Smithville, 4	January	6
Marshville, 4	"	12
Pelham Centre, 4	February	12
Attercliffe Station, 4	"	14
Dunnville, 4	"	15
MUSKOKA, CENTRE—		
Raymond, 11	December	31
Utterson, 11	January	1
MUSKOKA, NORTH—		
Novar	December	21
Chaffey, 11	"	22
Hillside, 11	"	23
Brunel, 11	"	27
Ravenscliffe, 11	"	28
Stisted, 11	"	29
Cardwell, 11	"	30
MUSKOKA (Port Carling)—		
Port Carling	January	4
MUSKOKA, SOUTH—		
Beatrice, 11	January	3
Bardsville, 11	"	5
Bracebridge, 11	"	6
Uffington, 11	"	7
Gravenhurst, 11	"	8
NORFOLK, NORTH—		
Courtland, 4	January	18
Delhi, 4	"	19
Waterford, 4	"	20
Windham Centre, 4	February	22
Bealton, 4	"	23
NORFOLK, SOUTH—		
Vittoria, 4	January	15
Langton, 4	"	17
Port Dover, 4	February	18
Walsh, 4	"	19
Port Rowan, 4	"	21
NORTHUMBERLAND, EAST—		
Wooler, 8	December	2
Warkworth, 8	"	16
Brighton, 8	January	22
Castleton, 8	"	24
NORTHUMBERLAND, WEST—		
Harwood, 8	November	30
Grafton, 8	December	1
Fenella, 8	January	25
Baltimore, 8	"	26
ONTARIO, NORTH—		
Uxbridge, 7	December	7
Beaverton, 7	"	8
Goodwood, 7	January	15
Zephyr, 7	"	17
Udora, 7	"	18
Sunderland, 7	"	19
Cannington, 7	"	20
Brechin, 7	"	21
Uptergrove, 7	"	22
Longford, 7	"	24
ONTARIO, SOUTH—		
Whitby, 7	December	14
Claremont, 7	"	21
Port Perry, 7	January	29
Greenbank, 7	"	31
Epsom, 7	February	1
Myrtle, 7	"	2
Columbus, 7	"	3
Oshawa, 7	"	4
Pickering, 7	"	5
Whitevale, 7	"	7
OXFORD, NORTH—		
Kintore, 2	January	8
Embro, 2	"	10
Hickson 2b	February	12
Bright, 2b	"	14
OXFORD, SOUTH—		
Mount Elgin, 3	January	21
Norwich, 3	"	22
Otterville, 3	March	2
Oxford Centre, 3	"	3
Beachville, 3	"	4

PARRY SOUND, EAST—
Powassan, 11 ..... December 7
South River, 11 ..... " 8
Sundridge, 11 ..... " 9
Burk's Falls, 11 ..... " 10
Magnetawan, 11 ..... " 11
Sprucedale, 11 ..... " 18
Emsdale, 11 ..... " 20

PARRY SOUND, WEST—
Dunchurch, 11 ..... December 13
McKellar, 11 ..... " 14
Carling, 11 ..... " 15
Parry Sound, 11 ..... " 16
Orrville, 11 ..... " 17

PEEL—
Cheltenham, 7 ..... November 30
Caledon East, 7 ..... December 1
Bolton, 7 ..... January 4
Caledon, 7 ..... " 5
Streetsville, 7 ..... " 6
Brampton, 7 ..... " 7, 8
Malton, 7 ..... " 10

PERTH, NORTH—
Listowel, 2 ..... January 4
Milverton, 2 ..... " 5
Atwood, 2b ..... February 1
Millbank, 2b ..... " 2
Rostock, 2b ..... " 3
Shakespeare, 2b ..... " 4

PERTH, SOUTH—
St. Marys, 2 ..... January 6
Mitchell, 2 ..... " 22
Tavistock, 2b ..... February 15
Sebringville, 2b ..... " 16
Monkton, 2b ..... " 17
Staffa, 2b ..... " 18
Kirkton, 2b ..... " 19

PETERBOROUGH, EAST—
Norwood, 8 ..... December 17
Keene, 8 ..... " 18
Warsaw, 8 ..... January 11
Westwood, 8 ..... " 12

PETERBOROUGH, WEST—
Lakefield, 8 ..... December 20
Peterborough, 8 ..... " 21
Bridgenorth, 8 ..... January 8
Hall's Bridge, 8 ..... " 10

PRESCOTT—
Vankleek Hill, 10 ..... Dec. 8, 9
Fournier, 10 ..... January 22

PRINCE EDWARD—
Bloomfield, 8 ..... December 6
Demorestville, 8 ..... " 7
Cherry Valley, 8 ..... January 15
Waupoos, 8 ..... " 17
Milford 8 ..... " 18
Wellington, 8 ..... " 19
Ameliasburg, 8 ..... " 20
Consecon, 8 ..... " 21

RENFREW, NORTH—
Bromley, 10 ..... December 17
Forester's Falls, 10 ..... " 18

RENFREW SOUTH—
Renfrew, 10 ..... Dec. 15, 16
Eganville, 10 ..... January 29
Calabogie, 10 ..... " 31
Stewartville, 10 ..... February 1

RUSSELL—
Russell, 10 ..... Dec. 10, 11
Casselman, 10 ..... January 24
Kenmore, 10 ..... " 25

SIMCOE, CENTRE—
Minesing, 6 ..... January 14
Penetang, 6 ..... " 15
Edenvale, 6 ..... February 24
Allenwood, 6 ..... " 25
Wyebridge, 6 ..... " 26
Victoria Harbor, 6 ..... " 28

SIMCOE, EAST—
Coldwater, 6 ..... January 17
Orillia, 6 ..... " 18
Medonte, 6, afternoon ..... March 1
Hillsdale, 6, evening ..... " 1
Edgar, 6, afternoon ..... " 2
Crown Hill, 6, evening ..... " 2
Shanty Bay, 6, afternoon ..... " 3
Hawkstone, 6, evening ..... " 3
Uhthoff, 6, afternoon ..... " 4
Ardtrea, 6, evening ..... " 4
Severn Bridge, 6 ..... " 5

SIMCOE, SOUTH—
Beeton, 6 ..... January 8
Bradford, 6 ..... " 19
Athlone, 6 ..... February 21
Ivy, 6 ..... " 22
Stroud, 6 ..... " 23

SIMCOE WEST—
Avening, 6 ..... January 10
Duntroon, 6 ..... " 11
Nottawa, 6 ..... February 17
New Lowell, 6 ..... " 18
Everett, 6 ..... " 19

STORMONT—
South Finch, 10 ..... December 4
Monkland, 10 ..... " 6
Osnabruck Centre, 9 ..... " 14
Crysler, 10 ..... January 19
Newington, 10 ..... " 20
Avonmore, 10 ..... " 21

ST. JOSEPH ISLAND—
McLennan, 11 ..... January 13
Richard's Landing, 11 ..... " 14
Jocelyn 11 ..... " 15
Mountain, 11 ..... " 17
Tenby Bay, 11 ..... " 18
Marksville, 11 ..... " 19

UNION—
Clifford, 1 ..... January 15
Harriston, 1 ..... " 17
Lakelet, 1 ..... February 3
Mildmay, 1 ..... " 4

VICTORIA, EAST—
Bobcaygon, 7 ..... December 10
Fenelon Falls, 7 ..... " 11
Victoria Road, 8 ..... January 4
Cambray, 8 ..... " 5

VICTORIA, EAST—*Continued.*
Dunsford, 8 ..... January 6
Omemee, 8 ..... " 7
VICTORIA, WEST—
Lindsay, 7 ..... December 9
Oakwood, 7 ..... " 13
Woodville, 7 ..... January 25
Hartley, 7 ..... " 26
Little Britain, 7 ..... " 27
Valentia, 7 ..... " 28
WATERLOO, NORTH—
Berlin, 5 ..... January 21
Wellesley, 5 ..... " 24
Conestogo, 5 ..... March 7
Linwood, 5 ..... " 8
WATERLOO, SOUTH—
Galt, 5 ..... January 18
Baden, 5 ..... " 22
New Hamburg, 5 ..... February 22
Philipsburg, 5 ..... " 23
Haysville, 5 ..... " 24
New Dundee, 5 ..... " 25
Strasburg, 5 ..... " 26
Roseville, 5 ..... " 28
Ayr, 5 ..... March 1
Branchton, 5 ..... " 2
Hespeler, 5 ..... " 3
Preston, 6 ..... " 4
Breslau, 5 ..... " 5
WELLAND—
Stevensville, 4 ..... January 10
Welland, 4 ..... " 11
Niagara Falls South, 4. ..... February 8
Willoughby, 4 ..... " 9
Allanburg, 4 ..... " 10
Humberstone, 4 ..... " 11
WELLINGTON, CENTRE—
Elora, 5 ..... January 4
Hillsburg, 5 ..... " 10
Metz, 5 ..... February 8
Ennotville, 5 ..... " 9
Ospringe, 5 ..... " 10
WELLINGTON, EAST—
Kenilworth, 5 ..... January 7
Grand Valley, 5 ..... " 8
Mount Forest, 5 ..... February 3
Conn, 5 ..... " 4
Damascus, 5 ..... " 5
Arthur, 5 ..... " 7
WELLINGTON, SOUTH—
Guelph, 5 ..... Jan. 19, 20
WELLINGTON, WEST—
Glen Allan, 5 ..... January 5
Drayton, 5 ..... " 6
Moorefield, 5 ..... February 1
Palmerston, 5 ..... " 2
WENTWORTH, NORTH—
Rockton, 5 ..... January 15
Freelton, 5 ..... " 17
Waterdown, 5 ..... February 15
Millgrove, 5 ..... " 16
Kirkwall, 5 ..... " 17
WENTWORTH, SOUTH—
Jerseyville, 4 ..... January 4
Stoney Creek, 4 ..... " 5
Ancaster, 4 ..... February 1
Mt. Hope, 4 ..... " 2
Binbrook, 4 ..... " 3
YORK, EAST—
Agincourt, 7 ..... December 4
Unionville, 7 ..... " 6
Wexford, 7 ..... January 13
Scarboro Junction, 7 ..... " 14
YORK, NORTH—
Kettleby, 6 ..... January 20
Aurora, 6 ..... " 21
Mt. Albert, 6 ..... March 7
Sutton, 6 ..... " 8
YORK, WEST—
Woodbridge, 7 ..... December 2
Weston, 7 ..... " 3
Maple, 7 ..... January 11
Islington, 7 ..... " 12

DELEGATES' SUBJECTS.

ANDERSON, DUNCAN C., Rugby :

"Soil Cultivation; Care of Manure and How to Apply it," "Care and Management of Farm Teams," "Breeding and Feeding Hogs for Market," "Preparing Milch Cows and Veal Calves for the Canadian Market," "Clover as a Fertilizer," "Dehorning," "Fields, Fences, and Buildings" Evening subjects: "The Advantages of Farm Life," "A Ten Acre Farm," "How to Pay off a Mortgage."

BRODIE, Dr. WM., 409 Parliament Street, Toronto :

"Insects in Relation to the Farmer and Fruit Grower," "The Orchard," "Honey Bearing Plants."

BRODIE, G. A., B. S. A., Bethesda :

"Agricultural Education," "Weeds and their Eradication," "Clover Culture," "Practical Economy," "Mistakes in Hog Feeding," "Corn Cultivating and Harvest," "Growing Roots," "Tile Drainage," "Farming,—the Old Way and the New."

BROWN, ALF., Picton :

"Lambs for Profit," "Clover and Short Rotation," "The Cheapest Way of Keeping up Fertility," "Sweet Corn versus Flint and Dent Varieties," "Corn for the Silo and Soiling," "Experiments Necessary for Selection of Best Varieties of Grains and Grasses," "Farmer's Vegetable Garden," "Growing Potatoes and Preventing Diseases of Same," "New Onion Culture," "The Farmer's Fruit Garden," "Strawberries, Raspberries, Gooseberries, Grapes," "Spraying, Pruning, and Grading for Market," "How to Retain Moisture in Surface Soil," "Planting and Care of Shade Trees and Windbreaks," "Selecting Poultry for Winter Layers," "Packing and Marketing Eggs," "Dressed Poultry," "Rearing Poultry by Natural and Artificial Methods," "Educate Young People by Practical Experience," "Ontario Agricultural College."

BURRELL, MARTIN, St. Catharines :

"The San Josè Scale," "Insects in their Relation to the Farmer and Fruit Grower," "The Farmer's Fruit Garden," "Theory and Practice of Horticulture," "Stone Fruits and their Pests," "Superstitions of the Farm," "Birds in Relation to Agriculture," "Mental and Moral Influences of the Farm Home," "Fruit Growers and Fruit Eaters."

CASTON, G. C., Craighurst :

"Cultivation of the Soil and Rotation of Crops," "Fodder Crops," "Poultry on the Farm," "The Best Varieties of Orchard Fruits and How to Grow Them, with Special Reference to Top Grafting of Hardy Stock," "Spraying," "The Best Varieties of Small Fruits for the Farmer's Garden." Evening subjects: "Insects and Fungi Injurious to Agriculture," "The Land we Live in," "Horticulture on the Farm."

DAY, G. E., B. S. A., Agriculturist, O. A. C., Guelph :

"Feeding Standards and Composition of Foods," (with chart): "Selection in Stock Breeding," "Experiments in Pig Feeding," "Soiling and Soiling Crops," "The Fertility of the Land," "Conservation of Soil Moisture," "The work of Experiment Stations."

DEAN, H. H., B. S. A., Professor of Dairy Husbandry, O. A. C., Guelph :

"The Dairy Cow: How to Know Her and How to Get Her," "Feed and Care of the Dairy Herd," "Care of Milk for Cheese Factory and Creamery," "Cream Separator," "How to Divide Money among Patrons of Creameries and Cheese Factories Equitably," "The Value of Dairy by Products, Whey, Buttermilk and Skim-Milk," "The Food Cost of Milk, Butter and Cheese," "Dairy Farming," "How Milk is Made by the Cow, and How Milking Should be Done." Evening subjects: "Farm Butter Making," "Food Economy in the Home," "Dairying in Europe," "Some Needs of the Dairy Market, and How to Fill Them," "Some Hints to Young People on How to Succeed," "The Farm House,—How to Build it," "Canada Our Home."

DUFF, THOMAS A., Toronto :

"Poultry and its Relation to the Farm," "Method of Caring for, Feeding and Housing Poultry," "Care of Eggs and Method of Marketing so as to Obtain the Best Profit Therefrom," "Market Poultry," "What the English Market Requires in Poultry and Eggs," "Co-operation," "The Value of Farmers' Institutes," "Diseases of Poultry and Simple Cures," "Experience with Incubators and Brooders," "Canada, Our Home," "Fertile versus Unfertile Eggs.

ELLIOTT, ANDREW, Galt :

"Butter Making," "The Dairy Cow," "Essentials to Success in Dairying," "The Silo," "Corn Growing and Filling the Silo," "Silage as Feed," "Clover Growing," "Curing Clover Hay," "Growing Turnips," "Why we Should Keep More Sheep," "Management and Feeding of Lambs," "The Breeding Sow," "Feeding for Profit," "Concrete Floors for Stables," "The Changed Condition of Agriculture," "Economy," "A Market."

EWING, J. B., Dartford :

"Care and Management of Swine," "The Hog as an Adjunct to the Dairy," "Care and Management of Sheep," "Corn Culture," "Clover Culture," "Dairying Twelve Months in the Year," "Our Fodder Crops," "The Training and Education of Boys for the Farm," "Topics of the Times," "Corn Culture," "Mixed Farming," "Present Problems."

FERGUSON, J. J., B. S. A., Smith's Falls :

"The Building and Equipment of Farm Creameries," "Home Butter Making," "The Dairy Cow," "Fodder Supply for Dairy Cattle," "The Corn Crop." Evening subjects : "A Look Around Us," "Giving the Boy a Chance," "Little Things."

FICHT, V., Oriel :

"Cultivation of the Soil for Grain, for Roots, and for Corn," "Breeding and Care of Sheep," "Cattle Breeding," "General Farming versus Special Farming," "Advice to Young Men."

FRASER, W. S., Bradford :

"Clover Growing and Curing," "Beef Rings among the Farmers," "Tree Planting for Shade and Windbreak," "Hog Raising," "Sheep Raising for Profit," "Corn and the Silo," "Underdraining." Evening subjects : "Butter Making on the Farm," "Farmers' Needs," "Farmers and Their Relationships."

GIBSON, D. Z., B. S. A., Willow Grove :

"Value of Humus in the Soil," "Stock Feeding," "Enriching and Cultivating the Soil," "Points of Excellence in Beef Cattle." "Clover Culture." Evening subjects : "A Talk to the Boys," "Cultivation of the Mind," "The Farmer as a Citizen."

GLENDINNING, H., Manilla :

"The Growing and Marketing of Grain," "The Growing and Marketing of Red and Alsike Clover Seed," "Weeds on the Farm," "The Farmer's Fruit and Vegetable Garden," "Dehorning," "Why Farmers' Sons and Daughters Leave the Farm."

GOULD, JOSEPH E., Uxbridge :

"The Value of Ensilage," "Cultivation of Corn," "How to Construct a Cheap Silo," "Feeding and Care of Dairy Cows," "Dairying versus Grain Farming," "Care of Farm Implements," "Success or Failure in Dairying," "Modern Methods of Cultivating the Soil," "Remedy for Over Production and Low Prices."

HALLMAN, A. C., New Dundee :

"Cultivation of Fodder Corn, and the Silo," "Practical Hints on Swine Industry," (the bacon hog illustrated) ; "The Breeding and Care of Dairy Cattle," (the dairy cow illustrated) ; "Rearing and Feeding Calves for the Dairy Herd." Evening subjects : "Winter Care of Idle Horses," "Farming as an Occupation."

HANMER, D. G., Burford :

"How to Establish a Flock," "Mistakes in Stock Breeding," "The Horse Industry," "Preparing the Soil for Wheat," "The Farm Home," "The Best Methods for Increasing the Fertility of the Soil."

HARRISON, F. C., B. S. A., Bacteriologist, O. A. C., Guelph :

"Tuberculosis and the Tuberculin Test," "Bacterial Contamination in Milk," "Pure Culture Starters." Evening subjects : "Water Supply of Farm and Village," "Ontario Agricultural College."

HILBORN, W. W., Leamington :

"Cultivation of the Orchard," "Small Fruit," "Ornamental Trees and Shrubs for the Farm, and How to Care for Them," "Cultivation of Flowers for the Lawn," "House Plants : How to Propogate and Grow Them," "Injurious Insects and Diseases."

HOLTERMANN, R. F. Brantford :

"The Advantages of Bee-keeping on the Farm," "The Advantages of Bee-keeping in a New Country," "How to Succeed as an Apiarist," "Bees in Relation to Plant Life." "The Wonders of the Honey Bee," "Poultry on the Farm," "The Ontario Agricultural College."

HONEY, R., Brickley :

"Selection and Care of a Stock Ram," "Marketing Lambs," "Selection and Care of Brood Sow and Young Pigs," "Selection and Care of Brood Mare and Young Colt." "Why Farmers Complain of Hard Times," "Economical Feeding of Dairy Cows."

HUTT, H. L., S. B. A., Horticulturist, O. A. C., Guelph :

"The Proper Management of an Orchard," "Growing Small Fruits," "Potato Culture," "The Farmer's Vegetable Garden." "Strawberry Culture." "Evening subjects : "A Talk to Farmers' Sons," "The Care of Flowers and House Plants."

JOHNSTON, ARTHUR, Greenwood :

"Selection, Management, Care and Feed of the Stock Bull," "How to Build Up and Maintain a Herd of Cattle," "Qualities Necessary in a Successful Flock or Herd Master," "Horses, What Should We Breed and How Should We Breed Them."

KETCHEN, A. P., Brucefield :

"Keeping Hogs for Profit," "Culture of Corn, Field Roots and Potatoes," "Breeding, Feeding and Handling Beef Cattle," "Cultivation of the Soil," "Making the Most of Ourselves."

LICK, ELMER, Oshawa :

"How to Control the Moisture in the Soil," "Feeding Dairy Cattle," "The Silo ; "Corn and Clover," "The Best Crops for the Stock Raiser," "Growing Apples," "Agricultural Education," "Co-operation among Farmers," "The Institute System."

LINTON, WM., Aurora :

"Cattle Breeding," "Cattle Feeding," "Growing Corn and Filling the Silo," "Sheep Breeding," "Draining," "Small Fruits and Orchand Culture."

LIVINGSTONE, MISS BESSIE :

The Food Value of Milk and its Derivatives," "Cooking of Milk, Cheese and Eggs," "A Practical Lesson on Invalid Cookery," "Diet for Children, "Cereal Food and Breakfast Dishes," "The Cookery of Vegetables," "Classes and Combinations of Foods,' "Hot Supper Dishes."

MASON, T. H., Straffordville :

"Hog Raising," "Sheep Raising," "Buttermaking," "Care and Food of Dairy Cattle," "Corn Growing," "Outlook of the Ontario Farmer," "Our National Heritage."

MEYER, J. E., Kossuth :

"How to Obtain the Greatest Return from Poultry on the Farm," "The Different Breeds of Poultry, their Uses, Characteristics, and Adaptibility to the Farm," "The Care and Management of Chickens, Young Turkeys, and Ducklings" "A Few Suggestions on How to Build a Poultry House and how to keep Fowl Healthy and Free from Vermin," "How to Build a Cheap Silo," "The Uses and Advantages of Cement in Farm Structures, with a Description of the Proper Methods of Applying It." (Illustrated by chart.)

MONTEITH, NELSON, B.S.A., Stratford :

"Underdraining," "Growing and Saving Corn," "Cultivation of the Soil," "Feeding Cattle for Export," "Farming as a Profession," "Country Roads."

MCCRAE, LIEUT.-COL. D., Guelph :

"Tuberculosis," "Cattle Breeding and Feeding," "Our Beef Trade," "Heavy Horses," "Sheep and Wool," "Clover Culture," "Our Pastures and Grasses," "Rye and Rape," "Rotation of Crops" "Our Farm Life," "Healthy Homes."

MCEWING, JAS., Drayton :

"Farm Fertilizers," "The Necessity of Systematic and Thorough Work," "Rotation and Cropping," "Why we Should Underdrain." Evening subjects : "Common Sense Education," "The Gospel of Home Influence."

McLean, Alex., Carleton Place :

"Poultry on the Farm." "Our Method of Dairying," "Feed and Management of a Dairy Herd" "Selection and Care of a Stock Bull," How to Obtain a Profitable Herd of Dairy Cows," "Care and Management of a Flock of Sheep," "Growing Corn, Storing and Feeding Ensilage."

McMillan, Thos., Seaforth :

"Breeding and Feeding of Beef Cattle," "Corn Growing and the Silo," "Draining Land," "Care and application of Manure," "Cultivation of the Soil," "The Clover Crop," "The Use of Concrete in Farm Structures." Evening subjects : "Farm Life, Its Conditions and Requirements," "Making our Way in Life," "My Experience in Meeting my Fellow Farmers."

McMillan, John, M.P.

"Benefits of Farmers' Institutes," "Draining Land," "Care and Application of Manure," "Cultivation of the Soil," "Rotation of Crops," "Growing Corn," "Breeding and Feeding Cattle," "Silos, are they Beneficial?" "Buying and Care of Implements," "Hog Feeding," "The Ontario Agricultural College," "Our Boys and Farm Life."

McNabb, Mungo, Cowal.

"Beef Production," "Sheep Breeding and Management," "Underdraining," "Corn Growing," "Country Roads." Evening subjects : "Fertility," "Boys on the Farm."

McNeill, A., Walkerville :

"How and When to Spray for Insects and Fungous Diseases," "Apple Culture," "Every Farmer his own Mason, or how to use Concrete in Farm Structures," (Illustrated with plans,) "Fruit Growing as a Specialty, or with General Farming," "Underdraining." Evening subjects : "The Education of the Farmer," "The Social Side of Farm Life," "Some Insect Friends and Foes" (illustrated with charts and specimens), "The Ontario Agricultural College," "Fruit and Flowers for Country Homes."

Orr, J. E., Fruitland :

"The Common Insects Attacking Fruit and Foliage, and How to Destroy Them,' "Fungi which Attack Fruit and Fruit Trees," "Spraying an Apple Orchard," "The San Jose Scale."

Palmer, W. J., B.S.A., Toronto :

"Our Markets, Local and Foreign," "The Chemistry of Foods," "The Manufacture and Sale of Fine Butter," "Cow Culture," "Milk—its Peculiarities, Composition and Uses." Evening subjects : "A Business Talk," "The Outlook for Young Men."

Patton, L., Oxford Mills :

"Care of Milk for Butter and Factories," "Dairying, as Compared with other Branches of Farming, from a Financial Standpoint," "Can Winter Dairying be Made Profitable?" "How to Divide Money among Patrons of Cheese Factories Equitably," "Butter Making on the Farm," "The Importance of Fodder Crops in the Cheap Production of Butter and Cheese," "Selection and Care of Dairy Cattle," "Maintaining the Fertility of the Farm." Evening subjects : "Beautifying the Farm," "The Farmer of the Future," "The Value of Education to the Farmer."

Peart, A. W., B.A., Burlington :

"Apple and Grape Culture," "Underdraining," "Mixed Farming," "Fertilization of Fruit Blossoms," "Injurious Insects and Fungi and how to Combat Them." Evening subjects : "Leaks on the Farm," "Agricultural Education."

Raynor, T. G., B.S.A.

"Selection and Cross-breeding of Animals." "Foods," "Our Fodder Crops," "The Dairy Cow," "Common Diseases of Domestic Animals," "Planting and Care of an Orchard," "Improving an Impoverished Farm." "Clover Culture," "Special Fertilizers," "Injurious Insects and Parasitic Plants on the Farm," "Swine Breeding and Feeding," "Management of Poultry," "The Pea Crop," "Corn Growing and the Silo," "Improvement to our Country Roads," "Underdraining," "Leakages on the Farm," "Care and Application of Manure," "Rotation of Crops," "Tillage," "Farming as an Occupation," "Agricultural Education," "The Agricultural College," "The Progress of Agriculture."

REED, J. HUGO, V. S., Professor of Veterinary Science, O.A.C., Guelph :

"Breeding Horses for Profit," "The Laws of Breeding," "The Ordinary Diseases of the Stomach of the Ox which a Farmer should Understand," "The Mare and her Foal," "How to Prevent Parturient Apoplexy (commonly called Milk Fever) in the Cow," "Tuberculosis in Cattle," "The Tuberculin Test," "The Education of the Horse," "The Essential Elements of Contagious Diseases," "The Agricultural College."

RENNIE, SIMPSON, Milliken :

"Underdraining," "Cultivation for Roots and Corn," "Destruction of Weeds," "Buying and Feeding Cattle for the British Market," "Rotation of Crops and the Cultivation Required," "Our Country, Past and Present," "Agriculture in Public Schools."

RENNIE, WM., Farm Superintendent, O.A.C., Guelph :

"Restoring and Maintaining Soil Fertility," "Rotation of Crops," "Culture of Roots and Corn." "Cost of Farm Productions," "Economic Feeding of Live Stock, Comparison of Breeds of Live Stock," "Beautifying the Farm."

REYNOLDS, A. J., Danforth :

"Silo and Ensilage," "Cultivation of the Soil," "Weeds," "Growing Clover," "Summer and Winter Dairying," "Farm Implements," "Farming, Past and Present," "Selection of a Home."

ROBERTSON, JOHN, Ingersoll :

"Underdraining," "Cultivation of the Soil and Crops," "The Best Crops for Feeding Cattle," "Different Breeds of Cattle for Producing Beef," "Different Breeds of of Cattle for Producing Milk," "Feeding and Care of Milch Cows," "Buttermaking in Private Dairies," "Buttermaking in Creameries," "Cheesemaking in Factories," Advantages on Mixed Farming," "Breeding and Feeding Pigs," Keeping Farm Accounts."

ROGERS, MRS. M. J., Kinsale :

"The Farmer's Home and its Surroundings," "The Influence of Home Surroundings on Young People," "The Road to Success."

ROSE, MISS LAURA, Assistant Instructor Dairy Department, O.A.C., Guelph :

"A Morning in an English Dairy," "The Making of Prize Bread and Butter,' "Methods of Cooking Apples," "Woman's Dress on the Farm," "Simple Process of Making Cheese for Home Consumption," "One Eve in the Fields, the Other in the Town" (French Proverb,) Readings suitable for evening meetings.

SHEARER, W. C., Bright :

"Growing Corn, and the Silo," "Growing Mangels," "How to improve a Dairy Herd," "Breeding, Raising and Feeding Swine for Profit." Evening subject : "Buttermaking in the Home Dairy."

SHEPPARD, MAJOR JAMES, Queenston :

"Country Roads, How to Improve Them," "Planting and Care of Orchards," "Propogating Fruits ; Grafting, Budding, etc." ; "Forty Years' Experience in Growing Corn," "Tomatoes for Home and Market," "Four Reasons Why we Till the Soil," "Three Historical Days on the Niagara River" ; "Window Gardening."

SMITH, D. E., Hamilton :

"The Feeding of Dairy Cattle," "Corn Cultivation, Ensilage, and the Silo," "Characteristics, Selection, and Development of the Dairy Cow," "Essentials of Successful Breeding," "Convenience, Construction, and Ventilation of Cow Stables," "Underdraining," "City versus Country as an Educator," "Business Principles on the Farm."

SMITH, WM., Columbus :

"Breeding and Care of Heavy Horses," "Cultivation of the Soil in Spring and Fall," "Elements of Success in Farming," "Breeding and Care of Sheep."

SMITH, MRS. J. L., Whitby :

"Farmers' Wives and Daughters, Their Duties, Delights, and Discouragements," "Young Men on the Farm, Their Chances of Success."

STEVENSON, R. S., Ancaster :

"Breeding and Rearing Dairy Cattle," "Feeding Dairy Cows," "Selecting Dairy Cows," "How to Choose a Bull for Service in the Dairy Herd."

THOMPSON, R., St. Catharines:

"Cultivation of the Soil," "Care of Small Fruits and Fruit Trees," "Gathering and Marketing Fruit," "Root Growing," "Corn Growing," "How Cultivation Benefits the Crops," "Care and Breeding of Turkeys," "Swine Breeding and Feeding," "City versus Country Life," "Underdraining."

TOLTON, JAS., Walkerton:

"Mistakes in Sheep Breeding," "The Care of Breeding Ewes," "Preparing Cattle for the British Market," "Cultivation of Roots," "The Farmer's Orchard," "How to make a Country Home Attractive."

WHEATLEY, T. C,, Blackwell:

"Our Weed Pests and How to Deal with Them," illustrated with numerous specimens, "The Importance of Keeping Farm Accounts, with illustrations of my own method," "The Farmer's Fruit and Vegetable Garden," with notes on varieties, insect pests and diseases; "The Importance of an Agricultural Education, with Special Reference to the Work being done by the Ontario Agricultural College."

YUILL, JOS., Carleton Place;

"Care and Management of Dairy Cattle," "Fodder Corn and the Silo," "Profits of Winter Dairying," "Points of a Dairy Cow," "Care and Application of Manure," "How to Enrich an Impoverished Farm," "Sheep Husbandry," "Profits of Poultry on the Farm," "Swine Breeding," "Clover Culture." Evening Subjects: "Buttermaking," "What Should we Teach our Sons and Daughters?"

ZAVITZ, C. A., B.S.A., Experimentalist, O.A.C., Guelph:

"The Best Varieties of Oat, Wheat, Barley, Peas, and Beans for Ontario," "Corn for Grain, Fodder, and Silage," "Potatoes and Roots—Varieties, Selection of Seed, and Methods of Cultivation," "The Importance of Sowing Good Seed," "How to Best Keep up the Fertility of the Soil," "Some of the Best Crops for Green Fodder," "Agricultural Experiment Stations and what they are doing for the Farmer."

INSTITUTE OFFICERS FOR 1897-8.

ADDINGTON.—President, Robert Nugent, Newburgh; Vice-President, Adam Gilmore, Tamworth; Secretary, J. B. Aylesworth, Newburgh.

ALGOMA, C.—President, Henry Knight, Sault St. Marie; Vice-President-, G. H. Farmer, Sault St. Marie; Secretary, George Peacock, Sault St. Marie.

AMHERST ISLAND.—President, Henry Filson, Stella; Vice-President, Wm. Allen, Stella; Secretary, T. J. Polley, Stella.

BRANT, N.—President, S. G. Kitchen, St. George; Vice-President, A. W. Vansickle, Onondaga; Secretary, Morley Howell, St. George.

BRANT, S.—President, D. G. Hanmer, Burford; Vice-President, W. H. Lewis, Burford; Secretary, Wm. H. Metcalf, Burford.

BROCKVILLE.—President, W. Neilson, Lyn; Vice-President, A. G. Gilroy, Glen Buell; Secretary, W. H. McNish, Lyn.

BRUCE, C.—President, D. N. McIntyre, Paisley; Vice-President, James Hendry, Glammis; Secretary, John Nelson, Paisley.

BRANT, N.—President, Cecil Swale, Wiarton; Vice-President, John Heath, Hope Bay; Secretary, Peter Anderson, Hepworth.

BRUCE, S.—President, Henry Arkell, Teeswater; Vice-President, Thos. Inglis, Belmore; Secretary, Jas. A. Lamb, Walkerton.

BRUCE, W.—President, J. B. Muir, North Bruce; Vice-President, Alfred Brunston, Invermay; Secretary, John Douglas, Tara.

CARLETON.—President, Edward Kidd, North Gower; Vice-President, Chas. Mohr, Mohr's Corners; Secretary, R. H. Grant, Hazeldean.

CORNWALL.—President, Jas. McLeod, Cornwall; Vice-President, Solomon Raymond, Moulinette; Secretary, C. W. Young, Cornwall.

DUFFERIN.—President, Alexander Clark, Waldemar; Vice-President, W. J. Craven, Shelburne; Secretary, John F. Breen, Melancthon.

DUNDAS.—President, A. Kennedy, Winchester; Vice-President, W. G. Smyth, Rowena; Secretary, J. P. Fox, Winchester.

DURHAM, E.—President, R. Vance, Ida; Vice-President, W. O'Brien, Millbrook; Secretary, W. Vance, Millbrook.

DURHAM, W.—President, W. E. Pollard, Bowmanville; Vice-President, M. A. James, Bowmanville; Secretary, H. C. Hoar, Bowmanville.

ELGIN, E.—President, Thos. Roberts, Sparta; Vice-President, L. C. McConnel, Lakeview; Secretary, J. C. Dance, Kingsmill.

ELGIN, W.—President, John Smailes, Eagle; Vice-President, A. S. Backus, Tyrconnel; Secretary, Arch. McColl, Aldboro.

ESSEX, N.—President, Peter Corbett, Puce; Vice-President, David Ure, Windsor; Secretary, N. J. Clinton, Windsor.

ESSEX, S.—President, J. C. Shepley, Kingsville; Vice-President, Isaac. A. Wigle, Ruthven; Secretary, G. W. Coatsworth, Kingsville.

FRONTENAC.—President, A. J. Sharpe, Kepler; Vice-President, John Simpson, Cataraqui; Secretary, Alexander Ritchie, Inverary.

GLENGARRY.—President, R. F. McRae, Lochiel; Vice-President, Wm. Wightman, Lancaster; Secretary, W. J. McNaughton, Lancaster.

GRENVILLE, S.—President, Robert Alder, Prescott; Vice-President, Jas. A. Fraser, Prescott; Secretary, Jas. Bennett, Spencerville.

GREY, C.—President, John Irwin, Red Wing; Vice-President, R. S. McLaughlan, Harkaway; Secretary, J. I. Graham, Vandeleur.

GREY, N.—President, Geo. Donald, Kilsyth; Vice-President, Malcolm Rutherford, Leith; Secretary, Jas. Smith, Inglis Falls.

GREY, S.—President, W. J. Young, Durham; Vice-President, Robert Morice, Orchard; Secretary, George Binnie, Bunessan.

HALDIMAND.—President, E. G. Overholt, Selkirk; Vice-President, Eph. Evans, Selkirk; Secretary, R. E. King, DeCewsville.

HALTON.—President, J. L. Warren, Acton; Vice-President, D. Hartley, Milton; Secretary, W. B. Robbins, Freeman.

HASTINGS, E.—President, J. C. Hanley, Read; Vice-President, G. N. Brintnell, Canifton; Secretary, John Stokes, Thomasburg.

HASTINGS, N.—President, Jas. McComb, Big Springs; Vice-President, Robert S. Allen, Cooper; Secretary, J. G. Foster, Moira.

HASTINGS, W.—President, John Holgate, Foxboro; Vice-President, J. S. Dench, Trenton; Secretary, B. Mallory, Frankford.

HURON, E.—President, Thos. Strachan, Brussels; Vice-President, Alexander Gardiner, Leadbury; Secretary, Geo. Hood, Sunshine.

HURON, S.—President, H. Smith, Hay; Vice-President, R. B. McLean, Kippen; Secretary, R. Gardiner, Farquhar.

HURON, W.—President, Wm. Bailie, Dungannon; Vice-President, Jas. Snell, Londesboro; Secretary, M. Lockhart, Auburn.

KENT, E.—President, E. B. Tole, Blenheim; Vice-President, Wm. Simpson, Ridgetown; Secretary, A. J. C. Shaw, Thamesville.

KENT, W.—President, J. R. Longmore, Chatham; Vice-President, W. C. McGregor, Tilbury; Secretary, John Clarkson, Chatham.

LAMBTON, E.—President, W. J. McAlpine, Warwick; Vice-President, John Hunter, Wyoming; Secretary, Joseph Osborne, Wyoming.

LAMBTON, W.—President, J. D. McDonald, Pt. Lambton; Vice-President, T. C. Wheatley, Blackwell; Secretary, C. A. Bertrand, Courtwright.

LANARK, N.—President, Alex. McLean, Carleton Place; 1st Vice-President, D. Moir, Almonte; 2nd Vice-President, John Forsythe, Cedar Hill; Secretary, G. W. McCready, Carleton Place.

LANARK, S.—President, Cyrus Davis, Perth; Vice-President, J. J. Ferguson, Smith's Falls; Secretary, Geo. Oliver, Perth.

Leeds N. and Grenville N.—President, Benjamin Mosher, Merrickville ; Vice-President, J. K. Weir, Easton's Corners ; Secretary, L. Patton, Oxford Mills.

Leeds, S.—President, W. M. Bass, Newboro ; Vice-President, John Cook, Warburton ; Secretary, Freeman Britton, Gananoque.

Lennox.—President, Henry Hunter, Napanee ; Vice-President, David Aylesworth ; Secretary, H. Aylesworth, Deseronto.

Lincoln.—President, R. W. Gregory, St. Catharines ; Vice-President, Jas. Sheppard, Queenston ; Secretary, J. Pawling, Port Dalhousie.

Manitoulin, E.—President, A. Hughson, Manitowaning ; Vice-President, S. McLean, Little Current ; Secretary, W. J. Tucker, Manitowaning.

Manitoulin, W.—President, John Coutts, Barrie Island ; Vice-President, John S. Mullin, Gore Bay ; Secretary, W. J. Totten, Gore Bay.

Middlesex, E.—President, Thos. Knapton, Masonville ; Vice-President, J. D. Thompson, Derwent ; Secretary, A. M. Munro, Glanworth.

Middlesex, N.—President, J. D. Drummond, Ailsa Craig ; 1st Vice-President, C. M. Simmons, Ivan ; 2nd Vice-Present, D. S. Cameron, Ailsa Craig ; Secretary, S. P. Zavitz, Coldstream.

Middlesex, W.—President, Mark Walker, Glencoe ; Vice-President, Wm. Young, Mount Brydges ; Secretary, A. McTaggart, Appin.

Monck.—President, J. H. Johnson, North Pelham ; Vice-President, Wilson Chambers, Hewitt ; Secretary, J. E. Cohoe, Wellandport.

Muskoka, C.—President, Thos. Howard, Allensville ; Vice-President, Alfred Kay, Port Sidney ; Secretary, John Wilson, Utterson.

Port Carling:—(Branch of Centre Muskoka)—President, L. Love, Port Sandfield ; Vice-President, R. Fawcett, Hamil's Point ; Secretary, J. E. Wilson, Redwood.

Muskoka, N.—President, A. Sproat, Aspdin ; Vice-President, Wm. M. Tipper, Ravenscliffe ; Secretary, Wm. Goldthorp, Ravenscliffe.

Muskoka, S.—President, W. H. Taylor, Allport ; Vice-President, Edward Lee, Bracebridge ; Secretary, Alex Barron, Bracebridge.

Norfolk, N.—President, L. L. Sovereign, Waterford ; Vice-President, Thos. Herron, Windham Centre ; Secretary, F. L. Culver, Waterford.

Norfolk, S.—President, Wm. Dawson, sr., Vittoria ; Vice-President, John Murphy, Silver Hill ; Secretary, Chas. E. Shearer, Vittoria.

Northumberland, E.—President, H. C. Curtiss, Warkworth ; Vice-President, Geo. Carlaw, Warkworth ; Secretary, J. B. Ewing, Dartford.

Northumberland, W.—President, Wm. Spear, Cobourg ; Vice-President, J. C. Rosevear, Cold Springs ; Secretary, R. Cullis, Camborne.

Ontario, N.—President, Thos. Feasby, Uxbridge ; Vice-President, R. S. Webster, Udora ; Secretary, Jos. E. Gould, Uxbridge.

Ontario, S.—President, R. W. Grierson, Oshawa ; Vice-President, Wm. Ormiston, Enfield ; Secretary, John Sinclair, Whitby.

Oxford, N.—President, G. A. Munro, Embro ; Vice-President, E. J. Pearson, Kintore ; Secretary, Jas. G. Munro, Embro.

Oxford, S.—President, V. Ficht, Oriel ; Vice-President, John Topham, Burgessville ; Secretary, M. S. Schell, Woodstock.

Parry Sound, E.—President, Henry Muir, Sundridge ; Vice-President, Richard Cole, South River ; Secretary, Jas. Dunn, Sundridge.

Parry Sound W.—President, Jos. Ryder, Parry Sound ; Vice-President, J. A. Huff, Parry Sound ; Secretary, Jas. S. Miller, Parry Harbor.

Peel.—President, Robert Marshall, Snelgrove ; 1st Vice-President, Albert S. Rutherford, Castlederg ; 2nd Vice-President, Wm. Clarkson, Malton ; Secretary, R. McCulloch, Snelgrove.

Perth, N.—President, Duncan Stewart, Hamstead ; Vice-President, John Brydon, Milverton ; Secretary, Joseph Pugh, Milverton.

Perth, S.—President, Wm. White, Mitchell ; Vice-President, Patrick Whelehan, St. Marys ; Secretary, P. S. Armstrong, St. Marys.

PETERBOROUGH, E.—President, F. Birdsall, Birdsall; Vice-President, E. Hawthorne, Warsaw; Secretary, Chas. O'Reilly, Norwood.

PETERBOROUGH, W.—President, Ed. M. Elliott, Peterborough; Vice-President, G. W Bennett, Peterbourgh; Secretary, Wm. Collins, Box 926, Peterborough.

PRESCOTT.—President, Jonathan Cross, Caledonia Springs; 1st Vice-President, John Ryan, Fournier; 2nd Vice-President, Samuel Howes, Cassburn; Secretary, Wm. Macadam, Vankleek Hill.

PRINCE EDWARD.—President, G. V. Christy, Bloomfield; Vice-President, G. N. Rose, Waupoos; Secretary, A. S. Yarwood, Picton.

RENFREW, N.—President, Henry Jameson, Pembroke; Vice-President, Osbourne Wright, Beachburg; Secretary, John Brown, Beachburg.

RENFREW, S.—President, Robert McLaren, Renfrew; Vice-President, J. Affleck, Harvey; Secretary, Gregor MacIntyre, Renfrew.

RUSSELL.—President, W. C. Edwards, M.P., Rockland; 1st Vice-President, Benj. Rothwell, Ottawa; 2nd Vice-President, Robert McTavish, Vernon; Secretary. W. R. Craig, Russell.

SIMCOE, C.—President, Chas. Rankin, Wyebridge; Vice-President, R. M. Parnell, Wyevale; Secretary, G. C. Caston, Craighurst.

SIMCOE, E.—President, Col. O'Brien, Shanty Bay; Vice-President, D. M. Harvie, Orillia; Secretary, R. A. Lehmann, Orillia.

SIMCOE, S.—President, Thos. Cross, Bond Head; Vice-President, P. M. Faris, Bradford Secretary, Edward Jeffs, Bond Head.

SIMCOE, W.—President, Chas. Lawrence, Collingwood; Vice-President, F. E. Webster Creemore; Secretary, W. A. Furlong, Nottawa.

STORMONT.—President, Elias H. Bush, Lunenburgh; Vice-President, A. W. McIntyre, Newington; Secretary. C. W. Young, Cornwall.

ST. JOSEPH ISLAND.—President, Chas. Young, Richard's Landing; Vice-President, A. Cheer, Richard's Landing; Secretary, Wm. Irwin, Gawas.

VICTORIA, E.—President, W. H. Cullis, Powles' Corners; Vice-President, Thos. Robertson, Dunsford; Secretary, Wm. Thurston, Bobcaygeon.

VICTORIA, W.—President, J. F. Dix, Little Britain; Vice-President, Albert Davidson Glandine; Secretary, Jas. Keith, Lindsay.

WATERLOO, N.—President, J. H. Campbell, Crosshill; Vice-President, A. W. Devitt, West Montrose; Secretary, Allen Shantz, Waterloo.

Waterloo, S.—President, Wm. Slater, Galt; Vice-President, Menno Shantz, New Dundee; Secretary, Andrew Chisholm, Galt.

WELLAND.—President A. B. Robertson, Pt. Robinson; Vice-President, H. H. Beam, Black Creek; Secretary, E. Morden, Niagara Falls South.

WELLINGTON, C.—President, Jas. Sharp, Rockside; Vice-President, Wilson Ransom, Fergus; Secretary, George Wright, Elora.

WELLINGTON, E.—President, Albert Hillyer, Kenilworth; Vice-President, W. H. Mallett, Teviotdale; Secretary, George Cushing, Kenilworth.

WELLINGTON, S.—President, Wm. Rae, Arkell; 1st Vice-President, Wm. McCrae, Guelph; 2nd Vice-President, W. W. Kenny, Guelph; Secretary G. B. Hood, Guelph.

WELLINGTON, W.—President, S. M. Clemens, Drayton; Vice-President, A. Johnson, Moorefield; Secretary Jas. McEwing, Drayton.

UNION, (Branch of West Wellington).—President, Alex. Drummond, Clifford; Vice-President, R. Wallace, Lakelet; Secretary, D. Campbell, Clifford.

WENTWORTH, N.—President, T. S. Henderson, Rockton; 1st Vice-President, L. J. Mullock, Waterdown; 2nd Vice-President, Henry Watson, Kirkwall; Secretary, Jos. Stephenson, Freelton.

WENTWORTH, S.—President, W. M. Orr, Fruitland; Vice-President, Daniel Reed, Glanford; Secretary, Erland Lee, Stoney Creek.

YORK, E.—President, Jos. Armstrong, Danforth; 1st Vice-President. T. A. Patterson, Agincourt; 2nd Vice-President, A. J. Reynolds, Danforth; Secretary, J. C. Clark, Agincourt.

YORK, N.—President, C. H. Dennis, Newmarket; Vice-President, F. W. Heacock, Kettleby; Secretary, R. W. Phillips, Newmarket.

YORK, W.—President, Jas H. Smith, Highfield; Vice-President, Thos. A. Duff, Toronto; Secretary, R. L. Crawford, Maple.

REPORTS OF LOCAL FARMERS' INSTITUTES

Institute District.	Membership, December, 1896.	Membership to July, 1897.	No. of meetings held.	Total attendance.	No. of papers read or addresses delivered.	Receipts.					
						Cash on hand per last report.	Members' fees.	Donations.	Grants.	Receipts from conventions.	Receipts from excursions.
						$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Addington	59	51	5	458	34	27 78	15 50	.....	50 00	.....	.....
Algoma, Centre	91	105	5	150	24	56 50	25 25	.....	50 00	.....	.....
Algoma, East	75	16	3	332	19	.....	.....	.....	.....	.....	.....
Amherst Island	63	67	5	970	8	7 27	17 00	.....	50 00	.....	.....
Brant, North	73	122	6	1,030	28	27	30 25	.....	50 00	.....	.....
Brant, South	54	64	5	473	26	33 00	14 50	.....	50 00	.....	.....
Brockville	141	115	5	1,105	23	1 77	27 50	.....	50 00	.....	.....
Bruce, Centre	146	151	6	1,840	31	19 97	37 50	.....	75 00	.....	.....
Bruce, North	.....	61	3	571	13	.....	14 75	.....	.....	.....	.....
Bruce, South	71	124	5	2,165	29	105 39	12 50	.....	50 00	.....	15 00
Bruce, West	181	149	6	1,047	26	103 84	37 25	.....	75 00	.....	50 00
Carleton	58	107	5	545	23	21 89	13 00	.....	50 00	.....	.....
Cornwall	78	99	7	1,180	17	19 20	23 75	12 50	37 50	.....	.....
Dufferin	60	90	6	788	40	137 74	20 00	.....	25 00	.....	.....
Dundas	231	290	5	2,545	38	37 18	71 00	.....	50 00	.....	.....
Durham, East	156	122	6	350	15	43 50	26 75	.....	50 00	.....	.....
Durham, West	106	168	9	735	20	87 84	42 00	.....	50 00	.....	.....
Elgin, East	159	234	5	940	17	45 44	54 00	.....	50 00	.....	.....
Elgin, West	135	193	6	1,135	30	14 71	60 75	.....	50 00	.....	.....
Essex, North	55	94	5	575	34	33 10	23 00	.....	50 00	.....	.....
Essex, South	98	157	9	1,215	45	146 39	39 00	.....	50 00	.....	.....
Frontenac	92	138	5	1,140	31	17 14	33 50	.....	50 00	.....	.....
Glengarry	207	193	7	1,850	21	.....	49 00	.....	50 00	.....	.....
Grenville, South	92	118	5	1,455	25	75 68	26 75	.....	50 00	.....	.....
Grey, Centre	140	140	6	944	31	42 75	37 75	.....	25 00	.....	.....
Grey, North	281	305	14	1,774	70	58 02	74 00	.....	50 00	.....	12 96
Grey, South	107	109	5	4,240	27	149 31	25 00	.....	50 00	12 45	.....
Haldimand	115	200	5	1,253	44	69 57	47 75	.....	50 00	.....	.....
Halton	210	278	5	1,940	26	110 97	69 25	.....	50 00	.....	66 40
Hastings, East	135	124	5	925	36	18 58	28 25	.....	50 00	.....	17 30
Hastings, North	278	390	20	1,927	86	33 56	100 00	.....	50 00	.....	17 30
Hastings, West	97	135	6	845	33	33 98	33 75	.....	50 00	.....	15 63
Huron, East	187	176	8	1,350	32	143 44	43 50	.....	50 00	.....	.....
Huron, South	145	143	5	1,840	29	25 74	35 25	.....	50 00	.....	114 40
Huron, West	140	95	7	1,700	29	151 09	24 75	.....	25 00	.....	.....
Kent, East	236	242	9	1,155	47	10 88	57 25	.....	25 00	.....	.....
Kent, West	139	203	6	790	37	110 02	50 75	.....	50 00	.....	.....
Lambton, East	144	185	7	855	40	37 75	46 25	.....	50 00	.....	.....
Lambton, West	229	210	8	815	28	.....	55 00	6 19	75 00	.....	.....
Lanark, North	365	390	8	3,535	26	.....	142 25	.....	75 00	.....	.....
Lanark, South	180	254	7	2,195	49	14 52	64 00	.....	75 00	.....	.....
Leeds, N., and Grenville, N.	112	122	6	1,865	35	56 30	30 00	.....	50 00	.....	.....
Leeds, South	179	204	6	1,707	34	.....	51 25	.....	50 00	.....	.....
Lennox	591	65	6	716	14	83 17	29 50	3 00	50 00	.....	.....
Lincoln	111	139	6	1,535	30	29 50	26 50	.....	50 00	.....	.....
Manitoulin, East	74	122	7	637	12	40 50	19 50	.....	25 00	.....	.....
Manitoulin, West	37	55	5	165	6	.....	12 75	.....	.....	.....	.....
Middlesex, East	236	331	7	1,925	45	72 09	52 00	.....	50 00	.....	76 50
Middlesex, North	285	370	10	2 863	74	155 15	156 25	.....	50 00	.....	.....
Middlesex, West	218	227	8	2,610	38	96 58	56 00	.....	50 00	.....	.....
Monck	108	131	6	808	35	76 78	32 75	.....	45 00	.....	.....
Muskoka, Centre	81	59	6	261	10	5 04	14 75	.....	30 00	.....	.....
*Port Carling	50	27	5	109	22	8 15	7 00	.....	.....	.....	.....
Muskoka, North	57	128	10	548	28	3 41	14 75	.....	30 00	.....	.....
Muskoka, South	109	66	7	305	25	48 61	14 50	.....	25 00	.....	.....
Norfolk, North	220	234	6	1,621	60	67 76	59 00	.....	.....	.....	.....
Norfolk, South	119	99	6	245	26	15 71	24 00	.....	50 00	.....	.....

* Branch Institute

FOR YEAR ENDING JUNE 30TH, 1897.

Receipts.—*Con.*			Expenditure.												
Miscellaneous.	Balance due treasurer.	Total receipts.	Due treasurer per last report.	Expense for meetings.	Secretary's salary, etc.	Postage and stationery.	Printing.	Advertising.	Lecturers' expenses.	Lecturers' allowance.	Periodicals for members.	Miscellaneous.	Balance on hand.	Total.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
.....	.....	93 28	.....	15 25	20 00	7 38	8 00	.....	....	....	.. ..	20 00	22 65	93 28
40 90	.....	172 65	.....	8 00	8 30	3 17	4 00	11 30	....	.....	.....	109 80	28 08	172 65
					No annual report received.									
20 00	.....	94 27	.....	3 00	.....	1 00	5 00	.....	4 50	.....	.....	79 95	1 02	94 27
.....	....	80 52	.....	30 00	.....	9 75	25 17	...	11 95	.....	.....	1 55	2 10	80 52
.....	.....	97 50	.....	8 80	34 50	2 05	14 25	2 00	10 10	.....	.....	3 15	22 65	97 50
.. ..	.....	79 27	.....	3 00	15 00	2 25	2 00	16 35	9 50	.....	.....	5 50	25 67	79 27
6 35	.....	138 82	.....	14 10	15 00	1 00	.....	34 68	15 25	.....	7 00	19 97	31 82	138 82
.....	.....	14 75	....	.....	.....	1 57	75	4 75	.....	.....	.....	.....	7 68	14 75
3 00	.....	185 89	.....	10 75	32 50	5 61	29 75	75	3 00	.....	.....	2 00	101 53	185 89
9 00	.....	275 09	.....	10 35	35 00	5 82	39 68	2 00	24 47	.....	36 00	....	121 77	275 09
.....	4 62	89 51	.....	20 72	25 00	4 54	11 60	.....	4 00	.....	.....	23 65	.....	89 51
.....	.....	92 95	.....	6 25	25 00	3 00	18 00	1 00	14 83	.....	.....	.....	24 87	92 95
2 75	.....	185 49	.....	12 50	35 55	3 31	16 75	.....	.....	.....	.....	25	117 13	185 49
.....	.....	158 18	.....	50	29 80	6 16	1 25	30 00	20 22	.....	.....	90	69 35	158 18
.....	.....	120 25	.....	32 00	25 00	7 50	17 00	... ..	.....	.....	.....	..	38 75	120 25
93	.....	180 77	.....	5 00	10 00	2 17	55 90	.....	18 50	.....	.....	2 15	87 05	180 77
.....	32 30	149 44	....	.....	22 25	2 89	19 50	.. ..	....	...	.....	.....	72 50	149 44
68	.....	126 14	.....	9 10	40 00	10 33	37 52	1 00	27 37	.....	.....	65	17	126 14
.....	.....	106 10	.....	9 25	17 00	5 85	13 75	3 50	7 83	3 00	.....	25	45 67	106 10
.....	.....	235 39	.....	8 00	25 00	5 00	16 30	.....	16 90	.....	.....	4 25	159 94	235 39
.. ..	.. ..	100 64	...	2 00	20 00	2 96	18 00	12 05	10 85	.....	.....	4 20	30 58	100 64
5 00	21 79	125 79	14 35	22 00	25 00	4 64	22 95	1 00	13 0	.....	.....	22 85	.....	125 79
. ....	.....	152 43	....	8 00	20 00	3 41	14 00	.....	15 50	.....	.....	10 00	81 52	152 43
.....	.....	105 50	.....	32 58	16 55	4 80	5 00	4 00	13 25	.. ...	.....	1 83	27 49	105 50
.....	.....	194 98	.....	58 80	39 35	16 56	10 05	18 75	.....	.....	.....	66	50 81	194 98
.....	.....	236 76	.....	26 35	27 35	6 03	9 75	2 00	3 00	.....	....	.....	162 28	236 76
.....	.....	167 32	.....	3 50	20 00	11 50	14 50	.....	10 50	.....	....	.....	107 32	167 32
1 75	.....	298 37	.....	21 20	31 20	8 02	24 49	.....	1 50	.....	.....	46 76	165 20	298 37
.....	.....	114 13	.....	12 25	25 00	11 43	20 50	1 00	17 55	.. ....	.....	1 67	21 73	114 13
.....	.....	200 86	.....	16 75	90 00	19 05	21 89	.....	4 00	.....	.....	.....	49 16	200 86
.....	.....	133 36	.....	29 25	15 00	2 33	16 12	.....	.. ..	.....	.....	59	70 16	133 36
1 15	.....	238 09	.....	13 00	64 60	5 00	16 80	27 40	31 40	....	.....	10 75	69 14	238 09
... ..	.....	225 39	.....	28 05	22 25	2 62	8 00	18 75	12 95	.... .	.....	2 75	130 02	225 39
.....	.....	200 81	.....	27 75	37 85	12 55	23 75	28 25	.....	.....	.....	7 25	63 44	200 84
.... .	6 37	99 50	.....	19 25	20 00	22 20	.....	17 25	20 30	.....	.....	50	.....	99 50
.....	.....	210 77	.....	9 25	20 00	6 28	11 50	20 15	7 17	.....	.....	.....	136 41	210 77
.....	...	134 00	.....	29 85	23 00	7 50	9 75	.....	18 05	.....	.....	.....	45 85	134 00
.....	2 72	138 91	26 49	16 65	35 40	10 37	18 25	13 00	14 00	.....	.....	4 75	.....	138 91
3 00	19 97	240 22	62 02	60 00	20 00	2 50	7 00	51 90	36 35	.....	.....	45	.....	240 22
.....	.....	153 52	.....	66 70	20 00	2 83	.....	45 65	2 00	.....	.....	.....	16 34	153 52
.....	.....	136 30	.....	35 33	3 50	3 50	9 50	5 50	5 00	...	.....	40 00	33 97	136 30
.....	8 60	109 85	3 92	25 75	15 00	6 93	18 00	4 00	25 05	4 50	.....	6 70	.....	109 85
.....	.....	165 67	.....	10 25	10 00	50	1 50	22 35	10 00	.....	.....	31 60	79 47	165 67
. ....	.....	106 00	....	10 00	50 00	6 50	15 00	6 50	12 40	.....	.....	.....	5 60	106 00
.....	.....	85 00	.....	4 50	13 50	2 60	11 60	.....	1 45	.....	.....	60	50 75	85 00
.....	.....	12 75	.....	4 00	.....	68	3 85	.....	.....	.....	.....	2 75	1 47	12 75
2 97	.....	253 56	.....	31 00	20 00	11 93	28 50	18 47	16 25	.....	.....	15 25	112 16	253 56
.....	.....	361 40	.....	30 10	88 46	14 21	34 15	25	35 45	....	.....	75	158 03	361 40
.....	.....	202 58	....	45 65	42 00	3 45	13 75	3 25	.....	5 00	.....	15	89 33	202 58
.. ..	.....	154 53	.....	22 35	25 00	6 81	11 25	2 25	14 95	.....	.....	.....	71 92	154 53
.....	.....	49 79	.....	2 00	10 00	5 86	7 80	.....	.....	... ..	.....	3 95	20 18	49 79
.....	.....	15 15	.....	3 10	.....	1 65	.....	.....	.....	.....	.....	1 00	9 40	15 15
19 39	.....	67 55	.....	29 50	13 75	4 70	14 10	40	.....	.....	.....	5 10	.....	67 55
.....	.....	88 11	.....	15 20	10 00	1 21	19 75	.....	.....	.....	1 55	70	39 75	88 11
.....	.....	126 76	.....	28 50	35 00	13 20	13 20	.....	5 90	.....	.....	4 00	26 96	126 76
.....	.... .	89 71	.....	10 75	33 10	1 06	7 60	.....	12 77	.....	.....	.....	24 43	89 71

of Centre Muskoka.

REPORTS OF LOCAL FARMERS' INSTITUTES

Institute District.	Membership, December, 1896.	Membership to July, 1897.	No. of meetings held.	Total attendance.	No. of papers read or addresses delivered.	Receipts.					
						Cash on hand per last report.	Members' fees.	Donations.	Grants.	Receipts from conventions.	Receipts from excursions.
						$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Northumberland, East	160	101	6	1,985	39	30 99	25 00	.....	50 00	93 45	.....
Northumberland, West	84	108	5	1,140	12	50 68	27 00	.....	50 00	.....	.....
Ontario, North	215	370	8	1,335	52	23 70	67 90	.....	75 00	.....	.....
Ontario, South	274	326	11	986	61	19 66	80 75	.....	50 00	.....	.....
Oxford, North	72	159	5	1,670	34	47 84	21 65	....	50 00	.....	.....
Oxford, South	147	101	6	730	16	96 77	24 00	.....	50 00	.....	.....
Parry Sound, East	94	101	8	570	49	40 53	23 75	.....	25 00	.....	.....
Parry Sound, West	101	102	15	569	52	.....	24 50	.....	50 00	.....	.....
Peel	121	357	9	1,200	54	142 81	90 50	.....	50 00	.....	.....
Perth, North	123	128	5	1,660	34	7 17	30 50	.....	50 00	.....	.....
Perth, South	108	173	8	2,090	39	25	42 75	.....	50 00	.....	.....
Peterborough, East	124	148	6	3,895	37	.....	32 50	.....	50 00	.....	.....
Peterborough, West	103	128	7	1,260	36	50 05	32 00	.....	50 00	.....	55 17
Prescott	94	101	5	1,454	29	6 08	24 25	.....	50 00	.....	.....
Prince Edward	250	262	10	1,311	48	164 06	62 00	.....	50 00	.....	.....
Renfrew, North	120	69	5	655	10	13 31	15 75	.....	50 00	.....	.....
Renfrew, South	91	140	6	1,246	28	93 50	35 25	.....	50 00	.....	.....
Russell	105	54	4	750	18	45 02	14 25	.....	50 00	.....	.....
Simcoe, Centre	100	196	5	955	24	34 80	33 00	.....	50 00	.....	101 88
Simcoe, East	188	230	11	2,212	74	15 77	67 50	.....	50 00	.....	78 96
Simcoe, South	107	134	6	920	18	48 87	32 75	.....	50 00	.....	.....
Simcoe, West	171	194	10	2,873	47	.....	33 75	.....	50 00	.....	122 14
Stormont	85	113	7	940	33	.....	30 75	....	50 00	.....	.....
St. Joseph Island	70	84	11	996	59	83 16	21 25	.....	50 00	.....	.....
Victoria, East	102	119	5	2,090	29	.....	25 50	.....	50 00	11 05	.....
Victoria, West	120	162	7	1,420	48	64 20	72 35	.....	50 00	.....	.....
Waterloo, North	51	147	5	905	27	32 50	35 75	.....	50 00	.....	.....
Waterloo, South	281	465	12	3,545	119	15 08	116 25	.....	50 00	.....	32 65
Welland	104	121	7	1,170	46	106 51	30 75	.....	50 00	.....	.....
Wellington, Centre	146	160	6	1,060	35	52 25	35 25	.....	50 00	.....	30 23
Wellington, East	84	168	7	1,585	60	26 00	21 00	.....	50 00	.....	.....
Wellington, South	144	184	9	1,585	16	14 24	41 00	.....	75 00	.....	.....
Wellington, West	117	138	5	1,195	30	51 78	41 50	.....	50 00	.....	.....
Union	58	96	5	1,039	14	38	24 25	.....	25 00	.....	.....
Wentworth, North	121	142	6	1,240	31	17 41	34 25	.....	50 00	.....	.....
Wentworth, South	91	326	9	2,495	66	84 55	76 75	.....	50 00	.....	39 10
York, East	79	121	15	969	38	163 29	23 00	.....	50 00	.....	.....
York, North	69	92	5	670	18	27 31	23 00	.....	50 00	.....	.....
York, West	121	146	5	760	16	21 13	33 50	.....	50 00	.....	26 00
Totals	12,459	15,452	659	125,177	3,277	....	.....	.....	.....	.....	.....

Average attendance at local meetings, 1896: 154.

FOR YEAR ENDING JUNE 30TH, 1897.

Receipts.—*Con.*			Expenditure.												
Miscellaneous.	Balance due Treasurer.	Total receipts.	Due treasurer per last report.	Expense for meetings.	Secretary's salary, etc.	Postage and Stationery.	Printing.	Advertising.	Lecturers' expenses.	Lecturers' allowance.	Periodicals for members.	Miscellaneous.	Balance on hand.	Total.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
.....	.....	199 44	.....	103 00	33 75	5 00	18 00	.....	25 50	.....	.....	4 25	9 94	199 44
.....	.....	127 68	.....	39 10	18 00	4 15	7 50	3 00	.....	.....	.....	.....	55 93	127 68
.....	.....	166 60	.....	32 20	32 25	11 55	15 70	.....	6 50	.....	.....	5 27	63 13	166 60
.....	.....	150 41	.....	8 50	37 85	12 27	10 50	18 50	29 50	.....	.....	.....	33 29	150 41
.....	.....	119 49	.....	14 10	45 00	1 35	29 00	14 05	2 00	.....	.....	50	13 49	119 49
3 20	.....	173 97	.....	18 75	20 00	2 55	36 50	.....	14 40	.....	.....	.....	81 77	173 97
.....	.....	89 28	.....	29 85	15 00	2 05	10 00	3 00	.....	.....	.....	.....	29 38	89 28
4 50	.....	79 00	.....	39 80	19 35	5 14	11 75	.....	.....	.....	.....	.....	2 96	79 00
4 25	.....	287 56	.....	79 59	20 00	9 09	.....	40 20	.....	.....	17 10	.....	121 58	287 56
.....	.....	87 67	.....	12 25	18 50	3 03	11 00	16 50	24 85	.....	.....	50	1 04	87 67
.....	.....	93 00	.....	37 50	10 00	7 75	11 50	10 25	.....	.....	.....	9 75	6 25	93 00
.....	24 00	106 50	25 90	28 25	15 00	2 80	19 05	.....	16 25	.....	.....	14 25	.....	106 50
2 00	.....	189 22	.....	31 55	31 02	1 20	.....	30 45	16 30	.....	.....	40 00	38 70	189 22
.....	.....	80 33	.....	2 63	20 00	5 12	13 00	3 00	20 22	.....	.....	13 25	3 11	80 33
17 55	.....	293 61	.....	17 55	40 90	26 94	.....	46 30	23 70	.....	.....	28 08	110 14	293 61
.....	.....	79 06	.....	2 16	20 00	2 45	20 00	.....	7 50	.....	.....	2 00	24 95	79 06
.....	.....	178 75	.....	26 50	.....	1 07	.....	29 13	26 58	.....	.....	5 55	89 92	178 75
.....	.....	109 27	.....	4 50	26 00	3 75	13 35	.....	8 86	.....	.....	.....	52 81	109 27
.....	.....	219 68	.....	32 05	20 00	2 85	20 70	7 13	.....	.....	.....	90 71	46 24	219 68
1 35	.....	213 58	.....	43 90	26 95	12 82	31 66	21 40	10 50	.....	.....	45 03	21 32	213 58
.....	.....	131 62	.....	27 15	35 00	5 00	20 00	.....	16 50	.....	.....	35	27 62	131 62
11 25	.....	217 14	14 39	34 65	63 00	15 80	18 50	1 25	15 85	.....	.....	8 60	45 10	217 14
.....	17 72	98 47	.....	19 25	36 50	3 00	14 25	1 00	24 47	.....	.....	.....	.....	98 47
13 85	.....	168 26	.....	9 60	10 00	4 22	26 50	.....	.....	.....	13 35	70	103 89	168 26
.....	.....	86 55	3 56	12 25	21 25	6 08	21 00	.....	9 85	.....	.....	.....	12 58	86 55
.....	.....	186 55	.....	16 45	20 00	8 45	25 50	.....	.....	7 75	50 60	.....	57 80	186 55
.....	.....	118 25	.....	21 53	.....	5 46	16 25	.....	1 75	.....	.....	60	72 66	118 25
.....	.....	213 98	.....	49 65	40 00	9 06	36 50	3 50	6 90	.....	.....	4 05	64 32	213 98
.....	.....	187 26	.....	27 20	23 15	3 75	4 65	5 00	12 50	.....	.....	1 00	110 01	187 26
.....	.....	167 73	.....	49 60	10 00	6 71	13 75	13 75	5 75	.....	.....	6 00	62 17	167 73
.....	7 92	104 92	.....	13 50	27 20	3 67	25 50	75	14 95	.....	11 25	8 10	.....	104 92
11 50	.....	141 74	.....	11 75	20 00	6 70	20 50	10 30	11 65	.....	.....	49 00	11 84	141 74
.....	.....	143 28	.....	17 10	.....	8 85	12 25	2 00	8 50	.....	30 00	.....	64 58	143 28
.....	.....	49 63	.....	4 25	.....	3 46	6 28	.....	6 00	.....	.....	.....	29 64	49 63
.....	.....	101 66	.....	11 00	30 25	8 94	14 50	12 00	9 40	.....	.....	.....	15 57	101 66
.....	.....	250 40	.....	15 25	26 50	10 30	48 41	40 00	20 80	.....	.....	50	88 64	250 40
.....	.....	236 29	.....	16 00	20 00	14 65	.....	20 00	75	.....	.....	.....	164 89	236 29
.....	.....	100 31	.....	5 75	10 00	1 97	17 09	.....	10 00	.....	50	.....	55 09	100 31
.....	.....	130 63	.....	25 00	20 50	21 50	6 80	26 15	.....	.....	.....	3 50	27 18	130 63
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Average attendance at local meetings, 1897 : 190.

In addition to 125,177 persons who attended the various sessions of the Institute meetings in 1897, excursions to the Ontario Agricultural College and Experimental Farm, Guelph, were conducted by various Institutes as follows :

Date.	Institute.	Number of Excursionists who visited the College Farm.
June 9th	S. Perth	450
	S. Ontario	350
10th	Prince Edward	300
	Dufferin	250
11th	S. Simcoe	900
12th	N. & E. Middlesex	1,200
14th	N. Ontario	1,200
15th	S. Simcoe	1,400
16th	E. & W. Victoria	250
17th	N. Perth	1,100
18th	W. Durham	350
19th	Haldimand	700
21st	Bruce	600
23rd	N. Brant	600
24th	Wentworth	1,200
25th	Halton	900
	Peel	700
	S. Waterloo	2,000
26th	W. Simcoe	1,600
28th	W. Huron	600
	S. Wellington	400
	Small excursions not included in above, say	1,000
	Total	18,050

The foregoing data was obtained from the officials of the Ontario Agricultural College, and is as accurate as it is possible to give. The total number of persons who attended duly reported Institute meetings and excursions in 1897 was 143,227. In addition to these there were a number of meetings and excursions conducted by Institutes in Eastern Ontario which were not reported to the Superintendent and not credited in this report. The Institutes holding the largest number of meetings were :

Hastings, North	20
Parry Sound, West	15
York, East	15
Grey, North	14
Waterloo, South	12
Ontario, South	11
Simcoe, East	11
St- Joseph Island	11
Middlesex, North	10
Muskoka, North	10
Simcoe, West	10
Prince Edward	10
Durham, West	9
Essex, South	9
Kent, East	9
Peel	9
Wellington, South	9
Wentworth, South	9

The Institute meetings which were the most largely attended were :

Institute.	Number of Meetings held	Total Attendance.
Grey, S	5	4,240
Peterborough, E	6	3,895
Waterloo, S	12	3,545
Lanark, N	8	3,535
Simcoe, W	10	2,873
Middlesex, N	10	2,865

Institute.	Number of Meetings held.	Total Attendance.
Middlesex, W	8	2,610
Dundas	5	2,545
Wentworth, S	9	2,495
Simcoe, E	11	2,212
Lanark, S	7	2,195
Bruce, S	5	2,165
Perth, S	8	2,090
Victoria, E	5	2,090

The Institutes having the largest membership June 30th, 1897, are :

Name of Institute.	Number of Members.
Waterloo, S	465
Hastings, N	390
Lanark, N	390
Middlesex, N	370
Ontario, N	370
Peel	357
Middlesex, E	331
Ontario, S	326
Wentworth, S	326
Grey, N	305

Institutes having the smallest membership are :

Name of Institute.	Number of Members.
Algoma, E	16
Addington	51
Manitoulin, W	55
Brant, S	64
Lennox	65
York, N	69
York, E	79

Though Algoma East has only sixteen members it will be observed that Algoma Centre has 105 members and Muskoka North 128. The difference is entirely due to the efficiency, or lack of efficiency, of the local officers. This cannot be said of each Institute which has a small membership, but is generally the case. For instance, in a certain Institute district east of Toronto, for several years no meetings were held and no members enrolled ; the secretary, being written to many times, finally replied that it was no use writing to him for he had tried to interest the farmers but found that they took no stock in Farmers' Institutes. Another person was asked to form an Institute in this district, which he consented to do, and in less than two months a vigorous Institute was organized, and within four months the names and addresses of 156 members were returned to the Department. This Institute is now two years old and is a pronounced success. The reason of failure and success in this district was simply energy and efficiency in one case and the lack of it in the other.

A number of the Institutes hold meetings every two weeks excepting in July, August and September. At these meetings, in some districts, the proceedings are very informal. Each is a sort of experience meeting, where men who could not be persuaded to address a public gathering or to prepare and read a paper are induced to reveal the secret of their success, and to meet neighboring farmers and enter into friendly and helpful discussion with them. These small meetings, which convene in the school houses or other suitable places, have proved of great value to those who attend, and also to the Institute system at large.

There are in every neighborhood clever and successful men and women, both old and young, whose experience and education render them capable of imparting valuable information or rendering pleasant entertainment.

THE FIRST WOMEN'S INSTITUTE.

The First Women's Institute has been formed in Wentworth South, in connection with the Farmers' Institute in that district. The following is the first annual report:

Report of the Women's Institute at Saltfleet.

The Women's Institute was organized February 19th, 1899, Mrs. Hoodless being the promoter. The officers elected were as follows:

Honorary President ..... Mrs. John Hoodless.
President ..... Mrs. E. D. Smith.
First Vice-President ..... Mrs. Melson.
Second Vice-President ..... Mrs. J. Dean.
Secretary ..... Miss M. Nash.
Treasurer ..... Mrs. J. H. McNeilly.

The object of this Institute is to promote that knowledge of household science which shall lead to improvement in household architecture, with special attention to home sanitation, to a better understanding of the economic and hygienic value of foods and fuels, and to a more scientific care of children with a view of raising the general standard of the health of our people. For the better carrying out of the objects of this Institute, it shall be divided into six divisions, namely: 1. Domestic Economy; 2. Architecture, with special references to sanitation, light, heat, etc.; 3. Physiology, hygiene, medicine, calisthenics, etc.; 4. Floriculture, horticulture; 5. Music and Art; 6. Literature and Sociology, Education and Legislation. One Director is appointed for each division to arrange for papers, essays, addresses, etc., for each division at each meeting. We have a paid membership of 76. There have been six meetings held, which have been found very interesting as well as beneficial. We have been favored with and excellent address from Mrs. S. T. Rorer, of Philadelphia, the great scientific cook of America; a very interesting paper by Dr. Mabel Henderson, also a paper on the value of foods by Miss Watson, a graduate of Mrs. Rorer's cooking school. Mrs. Hoodless has given very interesting talks, and the papers given on subjects in the different divisions by members of the Institute, also discussions on the same, have made the meetings a great success.

(Signed) Mrs. E. D. Smith, President. (Signed) M. E. Nash, Secretary.

South Wentworth is the first Institute to take up this important department, but it is to be hoped that the day is not far distant when each local Farmers' Institute will have a Women's Institute affiliated with it. The fact is now recognized that young women, as well as young men, require special training to fit them for life on the farm. Many thoughtful persons believe that a Provincial school should be founded where farmers' daughters can receive a training suitable to their needs. Whether a Provincial institution for young women only is likely soon to be established is a matter for the future; meanwhile these Women's Institutes may be of great service in improving the condition of woman upon the farm.

F. W. HODSON,
Superintendent of Farmers' Institutes of the Province of Ontario.

APPENDIX.

SELECTED PAPERS READ AT MEETINGS

OF

FARMERS' INSTITUTES.

AGRICULTURAL DEPARTMENT.

CATTLE FORAGE CROPS.

By Lieut.-Col. McCrae, Guelph.

The farmer who confines his operations mainly to grain growing has not now an equal chance with the stock farmer. Mixed farming and the keeping of cattle have become more popular than grain growing because more profitable. Cattle feeding embraces three considerable branches which may be more or less mixed—the breeding and rearing of cattle, the feeding of dairy cows, and the fattening of beef animals. For the profitable feeding of cattle forage crops are necessary, and the following system has been adopted because it is found to suit for the growth of winter cattle feed. It may not be the best but certainly has considerably increased and cheapened the amount of rough winter feed

Crop of rye and clover, cut for hay 24th June, 1897, on the farm of D. McCrae, near Guelph, Ont., estimated yield 4½ tons per acre.

available when compared with plans in use a few years ago. The farm is of moderate size, 95 acres. Part of this is taken up with small fields and paddocks near the barns for bulls and breeding stock. The soil is a sandy loam, in good order, and easily worked, slightly rolling with porous ground or sand sub-soil. The land for hoed crops—roots and corn—is plowed the previous fall out of sod, a new clover sod. It is manured during the winter and spring with fresh manure direct from the byres spread broadcast when drawn. The land for roots is given about sixteen loads per acre; the ground for mangels manured in the fall, ridged up for the winter and the seed sown about the 1st of May, if the ground and weather be suitable. The ground allotted for roots will be about one-third of twenty five acres, the other two-thirds being for corn. An estimate is made of the manure available for the corn land, and it is put in the same way on the frozen ground or snow in the winter, worked up in the spring with the disc harrow, and the corn planted

in drills forty-two inches apart about the middle of May. These twenty-five acres are for grain the following year, oats and peas. The root ground is used for oats, either lightly plowed in the fall or left till spring and worked over with the cultivator and disc harrow. Have not yet been able to determine what is best for the corn ground. Am inclined to think that fall working is the best, but it may be that the spring cultivation is desirable for the corn ground. I have tried both plans without definite results. The part one-third for peas may be left and plowed in the spring after the other crops are in. The oats are sown with the drill and seeded with ten pounds of clover per acre, mixed red and alsike. Clover seed is sown before the drill and a portion mixed with the oats. Have tried seeding clover with the peas but results have not been satisfactory and it has been abandoned. In the fall the pea ground is worked over and sown with wheat. The oat ground with its seeding of clover is sown over with winter rye. If the catch of clover be but thin two bushels of rye may be used, drilled in on top of the stubble in the last week of August or the first week in September, preferably after a rain. It may grow so rank as to need pasturing which may be best done by calves or young stock if they be available. The next year this rye field with the clover mixture is made into hay, being cut after the bloom is off the rye and just as the clover is coming into blossom. It may be handled or cured as hay, or cut with the binder and shocked like grain. The former has given the best results.

As soon as the wheat is off, the land may be plowed and sown to a catch crop of rape, or it may be seeded to clover in the early spring to plow down in the fall for roots the following spring. In the fall the clover sod is pastured and afterwards plowed down for a corn crop as before. This, therefore, is a three year rotation-hoed crop, grain crop, hay and wheat. Of the larger crops, corn, oats, and hay, the rotation comes every third year at one time and every sixth the next time. The smaller crops, roots, peas, and wheat, may be managed to come only once on the same ground every nine years. This plan may not suit every section, but here it has given a large quantity of good, cheap winter feed.

CARE OF AND APPLICATION OF MANURE.

By Thos. McMillan, Seaforth.

The longer I continue to make a practical study of the science of agriculture, the more am I convinced of the great importance of taking good care of the manure heap. This opinion impresses me more forcibly when I happen to be upon the farm and around the outbuildings of many who are considered good farmers who are continually losing the most valuable portion of their manure before it is applied to the soil. So long as the growth of each year was allowed to remain and rot upon the land, the fertility of the soil was increased, as this growth obtained some of its nourishment from the atmosphere. But whenever we follow a methodical system of farm operation, whereby the growth of each year is removed from the soil, it follows that unless this extracted fertility is replaced in some way, the ultimate impoverishment of our land is only a question of time. This I believe to be one of the great reasons which led many of the older generation of farmers to change from their former methods of almost exclusive grain growing for sale to engage in a system of stock keeping, thereby enabling themselves to give back to the soil through the manure heap most of what the growing crops had extracted; yet it is surprising what a large percentage of the most valuable elements of our barnyard manure is annually allowed to go to waste, through improper care and treatment. There are still a few farmers who either make a practice of keeping their manure under cover or built up in nice, tidy, square heaps until it is applied to the land. As a rule they spread it over a large surface in the barnyard or under the drop of the stable roof where it will leach considerably, and the liquid portion, which is the more valuable part, is allowed to flow off on the roadside or into ditches. The method, also, of hauling green manure out into a large pile in the field, or turning it in the barnyard to allow it to rot is, I consider, a very expensive one.

I have always considered the manure question in this light: It costs nothing to look at the manure heap with the idea of doing something with it; but we certainly cannot touch it without going to some considerable expense, therefore I am content to let it alone till I haul it and spread it directly on the land, as all labor expended on manure certainly adds to its cost, but it does not add with the same certainty to its value. In speaking of the value of barnyard manure we must first understand that although plants take from the soil a number of substances which they require in order to perfect their growth, yet in practice there are only three of these substances we need to consider; these are nitrogen, phosphoric acid and potash. It has been found by careful experiment and analysis that the other substances although equally essential to the growth of plants are usually contained in the soil in much larger quantities, and most manures that contain these three elements contain the other ingredients as well; so that in estimating the value of manure it is always estimated upon the basis of the commercial value of these ingredients. I find that it has been estimated from careful analysis that a ton of ordinary fresh barnyard manure, when the horse, cattle and swine manure is all mixed together with straw used as litter, contains of

Nitrogen, 9 lbs., market value 15c. per lb	$1 35
Phosphoric acid, 4.2 lbs., market value 8c. per lb.....	34
Potash, 10.4 lbs., market value 5c. per lb.....	52
	$2 21

Of course the value of manure depends very much upon the food which is given the animals. The manure of animals fed on very rich food may contain more of these elements; and if fed upon straw alone much less. The condition of the animal must also be considered. When an animal is neither increasing in weight or giving milk, the manure it produces will contain the same amount of plant food as the food it consumes. The young growing animal and the cow giving milk will take from 25 to 50 per cent. of those three elements which its food contains; in the former instance to build up the bone and muscular system, and in the latter to supply the ingredients of milk, the balance going to the manure heap; whereas the fattening animal takes very little of these elements away during the fattening period, as the greater part of its increase is fat, which we are told is obtained by the plant largely from the atmosphere. The value of the manure of different animals also varies very much, and the fresh urine is much more valuable than the fresh solid excrement. From careful analysis obtained from the work "Science in Farming," the manure is worth:

	Solid excrement.	Urine.
From Horses	$1 36 per ton.	$3 62 per ton.
" Cattle	86 "	3 14 "
" Sheep	1 59 "	11 31 "
" Swine	1 79 "	3 06 "

Thus we see that one of the first necessities in the care of manure is to have water-tight stable floors, so that all the liquids will be held to be soaked up by bedding or some other substance, and thus have it mixed with the bulky portion of the manure rather than allow it to drop under the stables and thus be lost. It is important that the liquids should be soaked up soon after being voided, as it is found that the liquid manure lying in the stable gutter for twenty-four hours will ferment sufficiently to allow almost one-third of its nitrogen to pass off into the atmosphere. Prof. Roberts, of Cornell University, has found that horse manure piled up alone for four or five months loses one-half of its value, and cow manure loses forty per cent. If the manure from the different animals when taken out of the stables is mixed and put under cover where the animals can tramp over it while in the barnyard, it becomes comparatively solid and there is very little loss so long as it is not disturbed by turning. Unless upon a light sandy soil (on which manure often gives the best result when applied in a well rotted condition) I consider it is advisable when the manure is fairly free from foul weed seeds, to have it applied to the

land as soon as possible, for the reason that in this country we are never troubled with an overheated soil. In fact, the warmer the soil can be made the better, more particularly after seeding, to aid the germination of the seeds. We see this demonstrated clearly in the case of the benefit to corn crops of being planted upon plowed sod, as sod land is always rather warmer than a plowed stubble. In fact, wherever there is a decay of vegetable matter there is also a certain degree of heat generated (we see this plainly in the rotting of a manure heap); and I consider it is much better to have the generation of this heat going on in the soil rather than in the manure in the barnyard or a large loose pile.

In our own practice we draw our manure to the fields in winter and spread it directly upon the land. We then incorporate it into the surface soil in spring. In order to get over any difficulty which we might otherwise have with the long straw portion of the manure, we cut much of the straw used as litter; in this way it can be spread evenly over the land and easily worked into the surface soil. I believe in retaining the manure as near the surface as possible Many farmers are backward about spreading their manure upon the surface for fear of great loss through evaporation; but scientists tell us, and I believe correctly, that unless there is considerable fermentation there can be no escape of the valuable elements through evaporation. Now, too much fermentation cannot be produced without a considerable degree of heat, and this degree of heat cannot be attained after the manure is spread broadcast upon the land. After the manure is thus applied in the green condition it starts up a fermentation in the soil, which tends not only to pulverize the particles of heavy land, but also liberate and render available elements of plant food which the soil contains in a tied up condition.

With reference to the effect upon manure of allowing it to remain about the stables or yards until well rotted, it has been found by careful experiments that it will lose much less by being preserved under cover or even in nice square tidy deep piles, rather than spread over a large surface in the yard. I believe that one load of manure properly preserved under cover is worth two loads which have lain in the yards over summer. In preserving manure in sheds over summer, care must be taken to prevent the top of the pile from becoming too dry, as in this condition the nitrogen will be allowed to escape. To prevent this moisten the surface occasionally, spread over a little land plaster or cover to a depth of five or six inches with soil. I consider the time has come when it will pay every farmer to feed upon his farm all, or an equivalent to all, the coarse grains he can grow, in order that the manure pile may be as large as possible, as practical experience has proved beyond all doubt that farmyard manure is, taking it all in all, the most valuable, and admits of the most universal application of all manures, because of its beneficial influence in many ways. Its indirect value is probably as great if not greater than its direct value; for although we may say it contains all the elements of plant food, yet the total amount of plant food in a ton of farmyard manure is not so great. It has been estimated at less than one-twentieth of its total weight, and that it does not contain the three elements in the quantities in which crops require them; nor is their proportion always the most suitable, and the form in which the nitrogen and phosphoric acid is present is not always the best for immediate use. Therefore it is not as a direct chemical fertilizer that it is most valuable, but because it adds to the soil so much vegetable matter, so much humus, by which most soils are greatly improved; it enables the soils to retain an increased amount of water, and also absorb moisture from the air. Its dark color also tends to make soils warmer, and its decomposition assists in the solution of mineral matter in the soil. It also tends to make clay soils more open and friable and remedies the deficiencies of sandy soil. To sum up I may say that farmyard manure is a necessary bye product of the farm, and we should handle it in such a way as to show that we estimate it at its true value and not allow it to go to waste. I look upon it chiefly of value in restoring to good land, after cropping, those particular advantages which good land alone can give, and in helping, better than any other manure, when applied to poor land, to bring it up to the level of good land, or to enrich poor soils more naturally, as it were, than any artificial manures can possibly do.

FIVE LOADS OF MANURE PER ACRE ENOUGH.

By I. P. Roberts, Director, College of Agriculture, Cornell University, Ithaca, N.Y.

In answer to your request to outline our method in grass and clover culture, I may say, in brief, that the University farm was far from being fertile when cleared of its forest—hemlock and pine (hard and soft), interspersed with white and red oak where the land changed from a gravelly to a clay soil. When I took charge, more than twenty years since, I learned that the land had been tilled about twenty-five years; that timothy, corn, wheat and like crops had been raised and removed, but that little resultant manure had been returned to the fields. The hill pastures were extremely poor, and the level land gave, the first year I tilled it, scarcely more than twenty-five bushels per acre of oats and corn, and less than one ton of "daisy" hay per acre.

The dairy consisted of eight grade Shorthorn cows. We began to draw manure from the city, more than a mile away, and 450 feet below the level of the fields. This manure cost, when delivered, $1.25 per load. When fairly rotted it had become so far reduced in bulk as to make the cost per load, when drawn to the fields in the fall, fully $2.50 per load of about 3,000 pounds.

In a few years most of the noxious weeds of America and Great Britain appeared. The worst one, corn chamomile (Anthemis arvensis), is still with us in full force. This method of improving the fertility of the land went on for about five years, when the dairy was increased to twenty cows and about ten young animals, and besides we had the work horses and the colts. From this time on *no manure was purchased*; but the manure of the farm was cared for in covered barnyards and in rotting pits.

It was found that the hill fields could not be kept in the rotation profitably. They were therefore prepared in a superior manner, and sowed to fall wheat without manures or fertilizers. Ten days after the wheat was sowed about seven quarts of timothy seed were sowed, and in the spring seven quarts of mixed red and alsike clover seed per acre were sowed. (Blue grass asserts itself too freely naturally in this locality; other grasses to some extent.)

Since this seeding the plan has been to coax the grass to cover the entire ground. Once commercial fertilizers containing a relatively high per cent. of nitrogen were used. Most of these pastures have received a light dressing of coarse farm manures in the winter; the poorer knolls two dressings in the last eighteen years. Small quantities of clover, with a little timothy, have been sown about every five years early in the spring, followed by a harrowing with a sharp spiked tooth harrow, and then rolled. On the hill which tips to the north, lime has been used once to correct the acidity of the soil, and to prevent the growth of moss. We turn the cows on the pastures rather late in the spring, and keep on feeding a small grain ration until the grasses have some substance. One seven-acre day pasture and one four-acre night pasture serve to carry from twenty to twenty-four milch cows from spring until the last of July; then their food is supplemented from the other fields. It will be seen that the pastures receive, in the way of manure, some additions from the food obtained from other fields, and from the slight summer grain food fed in the barns, through the droppings of the animals. In the fall, field corn is used to supplement the permanent pastures and the clover pastures. The clover fields are mowed once and then pastured. The permanent pastures are now seeded so well that they look like good lawns, and, while the ground in many places is so light and gravelly that the grasses cannot grow for want of moisture late in the season, yet they keep fairly green, and when the fall rains come these old neglected hill sides are again clothed with a short, dark second growth.

Briefly, then, the pasture fields have been cared for and watched as carefully as a fond parent watches a loved child. The aim has been not to do too much for them, or the debtor side of the account would be too great. By supplementing the soil fertility judiciously, and allowing the land to do its best, satisfactory results have been reached.

We expect, in a normal year, two and one-half tons of mixed timothy and clover hay from the meadows. Last year it fell a little short; the year before we secured 2 6 tons of nicely-cured hay per acre. The seeding is done in the winter wheat crop. About four quarts of timothy seed are sowed some ten days after the wheat is drilled in. The object in withholding the timothy seed is to prevent it from becoming so large in the spring as to crowd the wheat in case the winter has been severe, and the wheat starts slowly. Seven to eight quarts of clover seed mixed in the proportion of two of alsike to six of medium red clover, are sowed before freezing has ceased. The wheat is cut rather high that the stubbles may protect the tender plants. When the rag weeds and other weeds and the clovers have grown to the height of the stubbles the machine is set high, and the field is mowed, and the stubbles, weeds, and tops of the clover are left upon the ground. Sometimes the clover asserts itself so strongly that the second sowing is resorted to, for it is believed that if the clover blooms profusely the first fall it will not give nearly so good results the following year. Then, too, if a large amount of material is left on the clover during the winter, and the snows chance to be abundant, the clover is sometimes seriously injured. After harvest mowing causes both the clover and timothy to tiller, and prevents most of the rank weeds from seeding.

If it would not appear egotistical, I may add that our best oat crop, raised some five years ago on a twenty-acre field, gave eighty bushels and fourteen pounds of weighed oats per acre. We have never been able to secure so large a yield on large areas since, though last year some of our carefully-measured plots of a tenth of an acre, third continuous cropping without manures or fertilizers, gave ninety-seven bushels and sixteen pounds per acre. We confidently expect, and usually secure on an average, sixty-five bushels of oats, as many bushels of corn, fifty bushels of barley, thirty-five bushels of wheat, two and one-half tons of hay, and thirty-five tons of mangels, and three hundred bushels of potatoes, per acre.

During this fifth of a century we have used very little commercial fertilizers, having found in early days that they did not give, in this locality, marked results. The farm has been brought up to its present degree of fertility by following in early days a carefully-matured five years' rotation which, however, has latterly been changed to a four years' rotation since the clover root borer has been abundant.

In recent years we have laid great stress on the conservation of moisture by tillage, and on cover crops, and on the care and management of the farm manures. The manures are usually spread thinly on the surface in the fall or early winter. By this practice we are able to give at least a "sandwich," if not a full meal, to every field that is under rotation, about every second year. Our rotation is (1) corn, manured; (2) oats or barley, unmanured; (3) wheat, manured; (4) clover and timothy, unmanured. Of course, it should be said that our small farm of about one hundred and twenty-five acres does not suffice for feeding forty to fifty animals that we keep, exclusive of fifty sheep and as many swine; but it is deemed wise economy to purchase some concentrated foods and take the resultant manures to the fields rather than to reduce the number of animals and purchase commercial fertilizers.

The manures are kept in covered yards during the winter until a suitable time for distributing them. About once a month all hands and teams distribute from the wagon or sleigh about five loads, 1,300 pounds per load, per acre, on the prospective corn ground. Some time in February our fifteen acres of corn ground will have been covered. In the spring when the cattle go to pasture the accumulated manure is drawn to near the centre of the farm, placed in a water-tight rotting receptacle, and left until the wheat ground is plowed. Then it is removed and applied before harrowing at about the same rate per acre. We aim to keep the plants from being gorged with a feast or starved by a famine. Our pastures at this writing, May 17th, are from four to eight inches high, and look unusually well, as rains have been abundant. Above all, the ground is covered, and the plants look as though they were neither hungry nor dry.

WOOD ASHES.

By R. Harcourt, B.S.A., Assistant Chemist, O.A.C., Guelph.

There is a growing interest in the subject of wood ashes, and their use as a fertilizer. This is largely owing to the fact that long cultivated lands are beginning to show a lack of the fertilizing constituents that are supplied by ashes, and a desire on the part of the tiller of the soil to increase and improve his yields. Large quantities of this valuable fertilizer are annually exported from the Province; and what makes it worse is that they are gathered chiefly from the farms which need them so badly. To supply the growing demand for information, and to gain a more definite knowledge of the fertilizing constituents of wood ashes, we have, during the last year, analysed the ash of most of the Ontario forest trees, fruit trees and small fruits.*

The growing plant gathers all its mineral constituents from the soil in which it grows, and these, not being combustible, are left as ash when the plant is burned; consequently, the ash must contain all the mineral constituents that are essential to growth. These are potash, phosphoric acid, lime, magnesia, iron and sulphur. These substances form a very small part of a plant, yet without them no plant could grow and produce seed; in fact they are indispensable to life. Of the six essential plant-food substances named, potash and phosphoric acid are the most important, not only because they are taken up by the plant in large quantities, but also from the fact that our average Ontario farms do not contain them any too abundantly. Wood ashes, therefore are usually valued according to the amount of those two constituents which they contain. Although potash and phosphoric acid are the most valuable plant-food substances in ashes, ashes also contain large quantities of lime, which is of considerable value to the growing plant. Lime is usually present in the soil in sufficient quantities to supply the wants of growth, yet its application may produce marked results. By acting chemically on certain constituents in the soil, plant food, especially potash, is brought into an available form. It neutralizes the free acid of the soil, and thus helps along the process by which vegetable matter is changed to a form in which the plant may make use of its nitrogen. It also tends to improve the mechanical condition of both clayey and sandy soils.

The amount of these fertilizing constituents contained in an ash will vary according to the source from which it is derived. The ash from young branches will be richer in potash than that from the older parts of the tree. Different soils will supply varying quantities of potash, phosphoric and lime. The following table gives the composition of a few of the more common ashes that we have analysed. The ashes were obtained by carefully reducing the several woods to a comparatively white ash. Each sample, therefore is true to name. The figures given express the percentages of the various constituents contained in the dry ash:

Name of Ash.	Potash.	Phosphoric Acid.	Lime.	Magnesia.	Iron.	Sulphuric Acid.
Hard Maple	9.31	2.03	45.24	.....	.....	1.14
Beech	7.58	1.39	41.21	6.16	.30	Traces.
Cedar	3.30	.98	49.06	2.49	.70	.77
Swamp Elm	35.37	.45	23.64	6.48	.19	Traces.
Black Ash	25.30	1.20	49.04	7.42	.22	.71
Hard Coal	Traces	.16	Traces.	.....	5.32	.41

The figures show clearly why ash buyers are so anxious to get black ash or swamp elm ashes, but at the same time it must not be forgotten that these ashes are very light and bulky; consequently there may be more potash in one measured bushel of hard maple ash than in the same bulk of swamp elm ash. The hard woods contain a larger quantity of phosphoric acid than the soft woods. Cedar, as would be expected, is poor in both potash and phosphoric acid. The price of potash and phosphoric acid, in the form

*For full reports of this work, see the Report of the Professor of Chemistry, in the Ontario Agricultural College Report for 1896. Some additions will be made in the report for 1897.

of artificial fertilizer, during the last year, has been 4 and 4½ cents per pound respectively. Figuring the value of the above ashes on this basis, we have the following as their value per ton :

——	Potash.	Phosphoric Acid.	Total.
Hard Maple	$ 7.44	$2.71	$10.15
Beech	6.06	1 25	7.31
Cedar	2.64	.88	3.52
Swamp Elm	28.29	.40	28.69
Black Ash	20.24	1.08	21.32

In many parts of the Province ashes can be bought from the producer at from 3 to 5 cents per bushel, or at a rate of $1.25 to $2.10 per ton. These ashes, in many ca es, will contain 10 to 15 per cent. of moisture, but after allowing for this, we see how far the price received is from their real value. By reference to the table of analysis in the College Report, and knowing from what woods the ashes on hand were obtained, one may calculate—at least approximately—their value. But the best way to know their value is by noting the increased yield when they are applied to crops requiring potash.

The caring for and application of ashes must receive special attention. If not properly housed while accumulating, much of the soluble plant food will be lost by leaching. If not applied to those crops which are in special need of potash, no noticeable results may be obtained. Further, if mixed with farmyard manure, they may do more harm than good ; because they tend to liberate, as ammonia, the nitrogen of the manure. The crops which are most benefitted by wood ashes are the legumes (clover, peas, beans, etc.) corn and potatoes. If we may judge by the amount used by fruit growers, they are fully aware of the value of wood ashes in the orchard.

HUMUS IN THE SOIL.

By D. Z. Gibson, B.S.A., Willow Grove

Humus is any animal or vegetable matter which is in its intermediate stage of decomposition. In prairie soils where the grass has not been removed for centuries, and where each season's growth goes back to the soil, it is found in great abundance. In fact, humus constitutes a large part of the almost inexhaustible fertility of such soils. In newly cleared lands it is found in varying amounts, having come from the partial decomposition of trunks, branches, roots, and leaves of trees, and other smaller vegetation that may have sprung up. In some swamps it occurs in large quantities in the form of muck. In tropical climates where the rate of decay is rapid, it is not so abundant as in temperate regions. As yet the chemical composition of humus is not well understood, nor has its functions and importance as a food for plants been clearly defined. Yet we know from observation and experience, that it is of prime importance to the farmer. Continued cultivation for years has greatly diminished the amount of humus in the soil of this Province, and the lack of this important element may account to a certain extent for the small crop returns and failure to get a good stand of clover. Chemists tell us that an average soil contains enough plant food to grow wheat at the rate of thirty bushels per acre for seventy years in succession without the addition of any fertilizer. Nature, however, is not so lavish with her treasures as to allow us to get this plant food in our grasp within the space of a few years. A great deal of it is locked up in an inert form, and can only be made soluble when surrounded by certain favorable conditions. It is the business of the farmer to furnish these conditions as far as he is able, and make use of whatsoever agencies he can in doing so. Humus is one of these agencies. It makes the soil more retentive of moisture. The early settlers can well remember that the spring freshets never took the form of such destructive floods as occur at the present day. This change is largely due to the fact that the surface of the earth possessed more humus or vegetable matter in the form of moss, decaying logs, stumps, etc., which retained a considerable portion of the moisture

that came from the rains and melting snows, thus making the descent of the water more gradual. D. J. Crosby, of the Michigan Experiment Station, conducted experiments which show the difference in soils to retain moisture. Samples of sand, clay, loam, and muck were placed in pots, and after being thoroughly dried, each was moistened with the same amount of water and exposed to a drying atmosphere. At the end of 97 hours the sand had lost all its moisture. The clay after 197 hours lost 99 per cent. of its moisture; the loam 91 per cent.; and the muck 62 per cent. At the same time the temperature of the sand was lower than that of the muck, but the superior retentive powers of the muck more than made up for the difference in temperature. Thus the muck soil which was richest in humus was the best retainer of moisture. Humus in the first five or six inches of a soil acts similar to a mulch except that the effect is not so marked. Now since water is one of Nature's greatest solvents, and since plants require, according to Hellriegel, 325 pounds of water to produce one pound of dry matter, it is important that a goodly supply of humus be kept in the soil, so that the bad effects of a dry season may be somewhat lessened.

The presence of humus in the soil, if the other conditions are the same, makes it warmer. This increase in temperature is due to the fact that it is of a dark color, thus absorbing the sun's rays more readily than a lighter colored substance. All know that a black garment is much warmer in a bright sunshine than a white one. The fermentations of organic matter which go on in a soil containing humus also produce a considerable amount of heat. A few degrees of increased temperature in a soil may not seem to be very important, but when it is remembered that the vital processes of plant life only begin after the temperature has risen above 45° to 48° Fahrenheit, we then see that a difference of two degrees may bring one soil up to the growing temperature, thus causing germination and growth, whilst in a cooler soil these changes would be less active. Humus facilitates nitrification, or the making of nitrates. This is a process of decomposition that takes place in the soil, in which the complex insoluble compounds are broken up into simple form available for plants. Those bacteria that play such a prominent part in the growth of certain plants, work more vigorously when in a soil containing plenty of humus. The presence of humus in a stiff soil improves its texture very materially. It also lessens the damage done by the puddling action of rain falling upon it, causing it to bake, especially when the surface has just been pulverized at the time of seeding. The tendency of stiff soils to contract, causing great cracks or fissures to appear, which tear or break off many of the smaller rootlets, thus depriving the plant of its means of water supply when most needed, is diminished when sufficient humus is present. The stiff texture of a clay soil is perhaps its greatest disadvantage, and as it is a fact that humus makes it more easily tilled (at the same time bringing other advantages), it is especially important that the farmer working a stiff soil should, as far as circumstances will permit, keep up the supply of this valuable material. On the other hand, it makes loose and open soils more compact and less liable to leach out the plant food in solution. We have briefly considered some of the benefits derived from humus, enough at least to prove that the average soil must contain a sufficient amount in order to get the best yield at the least cost.

How are we to increase this element in those soils that are lacking? is the next question. Since circumstances vary so widely, no one method can be given that will apply in every case, but some one or more of the following may be found helpful. First: Plowing down clover or clover sod not only increases the humus, but also augments the store of nitrogen. Second: Any grass sod turned under every four or five years. Third: Apply farm yard manure when fresh. Fourth: Where summer fallowing is practised in connection with the growing of winter wheat, winter rye may be sown in August or September on the field intended to be fallowed. Plow the rye under the following June. Buckwheat, because of its abundant root growth, makes it valuable as a producer of humus in conjunction with a fallow. The cultivation of a fallow or a crop tends to diminish the humus, but this cannot be helped, and as humus is one of the agencies that enable us to get the most out of the land, we may have to restore it just as we would have to cultivate again for another crop Cultivation also increases the nitrates which may be lost in the drainage water if there is excessive rainfall and the land is liable to leach. This danger has led some to object to the bare fallow. If rye or buckwheat is sown, it

ceases to be a bare fallow, as those plants take up the soluble plant food and store it in their tissues in a form not liable to waste, which when plowed under and decomposed, becomes soluble plant food again just at the time when the young wheat plants require it. Of course, should much rain fall during July or August, waste might occur, but usually dry weather prevails in those months in this Province. Fifth: Sow rape after the oats or barley is harvested, and plow under in the fall. Sixth: Peas plowed under when in blossom increase the humus and also the fertility. In a climate where they will thrive lupines and vetches answer well for this purpose.

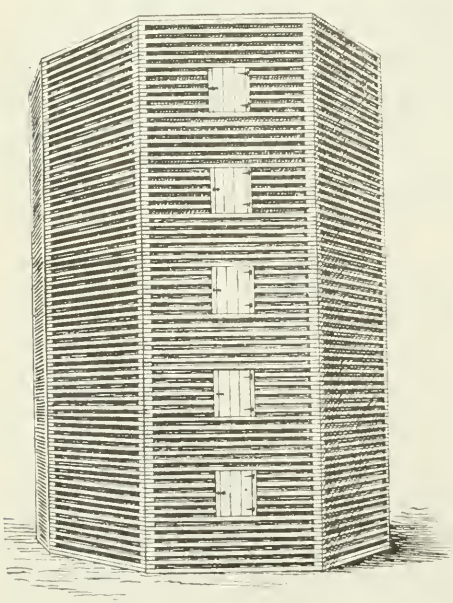
In conclusion, it might be said that any green vegetation that would not become troublesome as a weed nor interfere too much with the ordinary farm crops, will answer as a restorer of humus.

HOW TO BUILD AN OCTAGON SILO.

By R. A. Lehmann, Orillia.

When I want to get a waggon or an implement I go to all the agents in town, examine the goods and enquire the price, and choose after I have seen all. The silo is not for the wealthy only, but for every farmer keeping ten head of cattle or over. To convince you that it is profitable to use ensilage, I give you our experience. Last year we fed each of our cows ten lbs. chop; two lbs. cotton seed meal; twenty lbs. hay; and thirty lbs. carrots each day. This year we feed ten lbs. chop; two lbs. cotton seed meal; eight lbs. clover hay; and twenty-four lbs. ensilage, and obtained equally as good results. Reckoning hay at $7 per ton, carrots at ten cents per bushel, and ensilage at $2 per ton, you will find that the hay and carrots saved nine cents each, and the ensilage used to replace them only cost two and an half cents, thus leaving a gain of six and an half cents per cow per day. At the present time our cows have eaten about six tons of ensilage and we have already saved $65 in cow feed. An equal amount of gain has been realized from that which was fed to young stock and horses.

Our silo is twenty-four feet high, and nine feet nine inches from side to side, giving it a capacity of forty tons. If it is desired to feed only seven or eight head reduce the diameter; if twenty or twenty-five head are to be fed increase either the height or the diameter, or both. Our silo cost us about two weeks' work and $31 cash. There are 1,700 feet of two by four inch scantling, which we could buy for $7.50 per thousand; 800 feet of inch lumber at $5.50 per thousand, 2,500 feet sawing $7.50; two and an half rolls tar paper, $1 65; 103 lbs. nails, $3.85; total $31. We built on the surface of the ground, about six inches of loose soil being removed. The frame for the walls is made by cutting one end of the scantling at an angle of 135°; then turn the scantling on the other side and five feet from the first cut, cut again at an angle of 135°; turn again and cut another similar five foot piece, and so on until a sufficient number are cut. Then draw a circle eleven feet three inches in diameter, and place four of these pieces on the opposite sides of the circle with the shorter sides of the scantling outward, and touching the circle with the ends Then place the next four pieces in such a way that they span the spaces left between the first four and resting with their ends on the ends of the first four. Drive three four-inch nails through the upper into the lower at each corner. The first circle is then complete. Then place the third lot of four scantlings over the first



four, and again nail the ends on to the ends of the second lot, and so on. Care should be exercised to nail firmly and build straight. As a guide for this purpose it may be well to put up eight boards or long straight edged scantling at the exact place where the inside corners should be. When the frame becomes too high to reach from the ground, boards may be pushed through the spaces at convenient heights, thus making a temporary scaffold. When the frame is completed, the doors should be cut out, twenty-two by twenty-two inches. Begin at the bottom and count up twelve scantling. Cut out twenty-two inches from the twelfth and continue downward until five are cut out; then take two of the pieces that have fallen out and nail them to the cut ends of the scantling, these to serve as door jambs, and reducing the opening to twenty-two by eighteen inches in width. Count up another twelve scantling and cut the next door in like manner until five openings are made. Next put on the tar paper on the inside of this frame beginning at the top and putting the widths around horizontally. Lap about four inches to make air joints. Next put on a lining of inch boards to protect the tar paper; stand the boards upright. When the first round is complete, build a scaffold and nail in the second tier of lumber. If the lumber is twelve feet long it will reach the top. Finish the doors and bank up the earth a little both inside and outside and the silo is complete.

Some of the advantages of this plan are: (1) The silo can be easily lengthened when desired. (2) The ensilage settles well in it. (3) It is easily protected against frost, as the outside affords a convenient surface for covering with tar paper and lumber. (4) Any material sound enough to hold nails may be used, as the tar paper excludes the air. (5) All the scantling serve as hoops holding it together.

Note.—The volume or capacity of an octagon silo is the height multiplied by the area of cross section. The area of an octagon is = DxDx0.83, where D = diameter from side to side. Thus, if diameter = $9\frac{3}{4}$ ft. and height = 24 ft., area = $9\frac{3}{4} \times 9\frac{3}{4} \times 0.83$, and volume = $9\frac{3}{4} \times 9\frac{3}{4} \times 0.83 \times 24$. One cubic foot of ensilage weighs an average of 40 pounds. Therefore the capacity of such a silo is 75,746 pounds, or 38 tons nearly.

The capacities of similar silos, such as barrel silos or octagonal silos, vary directly as height and as the square of the diameter. Thus, if two silos have the same diameter but one is 30 ft. high and the other 24 ft. high, the former will hold 30/24 as much as the later. If both are 24 ft. high and one is 9 ft. in diameter and the other 10 ft, the former will hold $\frac{9 \times 9}{10 \times 10}$ or 81/100 of the other. A barrel silo $9\frac{3}{4}$ ft. in diameter and 24 ft. high, will hold nearly 36 tons. (35 tons +). The octagonal silo will hold more than a round silo of the same diameter.

The lumber used by Mr. Lehmann cost him less than it can be bought for in many sections, yet more than it can be procured for in other localities. Each person who wishes to build a silo must base his calculations regarding cost on the price of suitable lumber in his district. Since receiving Mr. Lehmann's article, an officer from the Department visited him in order to inspect his silo. From appearances it seemed satisfactory in every respect. It is very easily built, and it keeps the silage well. This is doubtless a desirable plan for silos in districts where lumber is cheap, and where a capacity is required not exceeding 100 tons. The material used by Mr. Lehmann is what is known as cull lumber, but is better than can be procured as this grade in many localities, though a large quantity of similar material is now for sale near Orillia at $3 per thousand.

CORN AND THE SILO.

By G. Harcourt, B.S.A., Toronto.

Corn and the Silo. What a significance these words are beginning to have. No crop grown upon the farm yields such an amount of good, nutritious food as corn does, and farmers are gradually finding the important bearing it has on their work. It is fast becoming a most potent factor in Canadian agriculture, and at Institute meetings no subjects are discussed with greater interest than those relating to the best ways of growing corn and of building and filling a silo. The acreage of corn grown for the silo has

steadily increased ; so also has the acreage planted for summer and fall feeding, and also for curing in the field for winter feeding. It is bound to increase because it is the one crop that will enable a farmer to keep more stock and thus produce more milk, beef, mutton, or pork than he ever did before. Thus it is a crop that will help him meet the increased competition with which he has to contend, and for this reason I commend it to farmers most unreservedly.

Preparation of the Land. Time will not permit to tell how all kinds of land should be prepared ; only two ways of preparing land have been selected, but they have proved very successful. There is no place equal to a good clover sod in which to grow corn, but any sod will furnish an excellent place. Many successful corn growers like to turn down a sod ten days or two weeks before planting time. It is turned over rather shallow and very flat ; it is well packed down and a good seed bed worked up. The heat generated by the decaying sod gives the corn a grand start. This plan, however, does not always work on a heavy soil. Mr. Wm. Rennie, farm superintendent at the Ontario Agricultural College, has adopted a good system of preparing land for corn. As early after the hay is cut as he can he plows down the sod and then keeps it worked on the surface. He thus kills the weeds the previous season and plants his corn on clean ground. The sod decays, the ground is full of plant food ready for the corn, and thus a good crop is ensured. In the fall instead of turning down all the fine mould which is full of plant food and free of weed seeds, he simply gathers it together in small ridges of two shallow furrows thrown together. It is held there until spring when it only requires the harrow to level the field and it is ready to plant. If manure can be spared it is worked in on the surface with a disc harrow, preferably in the fall. The work at seeding time is lightened, and the corn planted in rich soil which is ready to make it grow, and not weeds, because they were killed the previous year.

Thin Seeding. The old plan was to plant the corn quite thick. Experiment and experience has, however, shown that this will not produce plants that give the best results for feeding purposes. For best returns the rows should be from three to three and one-half feet apart, and the stalks of corn from eight to ten inches apart in the row. Many good corn growers prefer to plant their corn in hills instead of in rows. The distance between hills is the same as mentioned for rows, and from four to six grains are dropped in a hill. Four stalks to the hill will be plenty for good development of ear. The advocates of this plan claim that it takes less seed that better maturity (hence more real feeding value) is obtained, and that a cleaner field is secured because cultivated both ways. Mr. Rennie's plan will upset some of these arguments.

Early Planting. Corn should be planted as early as possible according to the season. If you cannot get it in early do not plant the large growing varieties, unless you are so situated that you can ripen them before the frost comes.

Varieties of Corn. Safe advice in regard to varieties of corn to plant, is to take a lesson from your neighbors ; find out what varieties have done well with them, then plant those varieties and try by way of experiment a few rows of some other variety that you think will do well. Never run a risk of losing your crop by planting an untried variety. Because a certain variety has done well in one part of the Province it does not follow that it will do equally as well in another part or even on another kind of soil. The large growing varieties such as the Mammoth Southern Sweet, Red Cob Ensilage, the Rural Thoroughbred White Flint, and the Giant Prolific Sweet should be planted early and only in those districts free from frost until after the middle of September. Such varieties as Mammoth Cuban and Improved Leaming ripen a little earlier ; while the White Cap Dent, Salzer's North Dakota, Longfellow, Pearce's Prolific, and Compton's Early will ripen shortly after the first of September when planted in good time. There are a great many varieties of corn, but the list of those most suitable to grow in any district can be cut down to a small number. It will pay every farmer to study the behavior of the different varieties in the experimental plots as reported by Mr. Zavitz in the College Report. Grow the variety of corn that will yield the greatest amount of feeding value per acre before the frost will injure it in the fall. Now this does not mean the variety that will grow the greatest weight or the largest amount of stalks. The greatest

feeding value is obtained when the corn reaches the glazed stage—that is, it is almost ripe. The following table taken from Professor Wall's little work, "A Book on Silage," will show the importance of growing a variety of corn that will nearly reach maturity. Note the increase in the dry matter as the corn passes from one stage of its growth to another. The dry matter contains the feeding value.

Table showing the increase in the feeding value of a corn crop as it passes from one stage to another in its growth :

—	Tasseled July 30.	Silked Aug. 9	Milk Aug. 21.	Glazed Sept 7.	Ripe Sept. 23.
	lbs.	lbs.	lbs.	lbs.	lbs.
Gross weight	18,045	25,745	32,600	32,295	28,460
Water in the crop	16,426	22,666	27,957	25,093	20,543
Dry matter	1,619	3,078	4,643	7,202	7,918

A variety of corn that will only reach the tasselling or silking stage by the time it is cut is not the most profitable one to grow ; it contains too much water and too little actual feeding value, and costs as much to grow as another variety that will have a far larger feeding value. Study to grow the variety of corn that will give the heaviest yield of well matured corn on your soil. The better matured the corn is, the better it will save in the silo.

Cultivation. Until the corn is six inches high, a pair of light harrows, or a Breed weeder, will be the best implement with which to stir the ground and destroy any young weeds that may start. A Breed weeder is just the thing for this, and it can be used until the corn is much higher. If Mr. Rennie's plan of preparing the soil is followed, cultivation is only needed to keep the soil stirred so as to retard evaporation. Cultivation with the cultivator should be fairly deep and wide to start with, becoming more shallow and narrow as the corn develops so as not to cut the roots. Cultivation should be frequent enough to keep down weeds and to break any crust that may form after a rain.

The Silo. So many plans for a silo are now before the public that I shall not attempt to describe one. Almost every neighborhood has one or more silos, and anyone wishing to build one can soon see how some neighbor's is built. The cheapest and most popular is the round stave silo, while the most durable and in the end the most economical is the cement concrete one. I have seen a large number of this kind, and have found that they keep the silage perfectly. They can be recommended. No matter what kind of a silo you build, be sure it is strong enough to stand the great pressure to which it is subject.

Extended uses. Extravagant claims were made for the silo by early advocates, but some of these claims have been abandoned and only sensible ones retained. There is, however, one claim that should be made for the silo, or one use to which silage should be put yet, that is for summer feeding. The last few seasons have been particularly dry ones, and many farmers have lost heavily because they did not take the precaution to grow a supply of green feed to meet the period of shortened pastures whether it was needed or not. Some farmers have been growing an increased acreage of corn for this purpose and find it good. But the best feed to supplement the pastures during drouth is good corn silage. Those who have tried it are loud in its praises. It is matured corn and thus furnishes a more substantial food than the immature corn. It is always ready to feed, and saves valuable time during the busy summer days when it seems to be such a bore to have to go to the field, cut, and bring in green feed. A smaller acreage than that devoted to green feeds, if devoted to corn, would grow the required amount. Try it.

After an experience of ten years with corn silage I am a stronger advocate of it than ever. I believe it has a most important place on every farm, and I can commend it in the strongest terms to the farmers of Ontario.

CORN GROWING AND THE SILO.

By John McMillan, M.P., Seaforth.

There is a strong prejudice among some farmers against ensilage and the silo, caused by the failure of many of those who first built silos to get a good sample of ensilage. The chief cause of failure was in cutting the corn before it was sufficiently matured, but through experience this difficulty has been overcome, and for the past three years we have had sweet ensilage. To grow corn successfully the land must have either an open porous subsoil or be underdrained. The system we follow in growing corn is to plow down the second crop of clover in the fall. We use a skimmer on the plow which assists us to cover all the clover. We plow a square furrow, setting it well up. Our land is heavy clay loam and clay, and we want it well exposed to the frost during winter. We put about fifteen loads of manure to each acre, spreading it on the land as we take it out. In the spring, as soon as the land is sufficiently dry, we harrow. Then after our other crops are in we go across the furrows with a spade harrow, which does good work, followed by the common harrow, and so continue until the surface is very fine. About the 12th of May we plant in squares about three feet four inches apart. We use a corn planter putting four or five grains to each square. We plant on the level and harrow at least once before the corn comes up, and twice after it is above the ground. When about nine inches high we begin to scuffle, not going more than about three inches deep, as we do not want to disturb the sod. We generally hoe around the corn and scuffle seven or eight times. Before we cut the corn we want it to stand about eight days after the ears are sufficiently matured to be used on the table as green corn.

The variety we use is called Western Yellow. We sowed it the first year alongside of Mammoth Southern Sweet, Red Cob Ensilage and other varieties. It matures eight days earlier than the two named varieties, produces more ears and grows about the same height; it is the best variety for our soil that we have tried. When we cut and fill the silos we put on a gang of men, two to cut, two to load, a boy to drive from the field to the barn, two to feed the cutting box, one to tramp, and one odd hand wherever wanted most. We want to fill the silo as rapidly as possible. We cut about one-half an inch long, for the shorter it is cut the closer it packs and keeps the air out better. After the silo is full it should be tramped solid on the top. For two years we put about twenty-five pails of water on the top; it kept fairly well. Last year it was tramped the day after it was filled, and for two weeks it was tramped every second day, especially along the walls. There was nothing put on the top of the corn, and when we began to feed there was only about three inches spoiled on the top. In feeding out take the ensilage off all along the top. It should be taken off every day, or every second day at least, for if left longer it is apt to get mouldy. The last silo we built was put in the corner of a barn. It is $19\frac{1}{2}$ x $17\frac{1}{4}$ and twenty five feet deep. There are stone walls on two sides about ten feet high; on the other two sides there are cedar sills for the studs, which are 10 x $2\frac{1}{2}$ inches, eighteen inches apart, then a coat of good hemlock lumber run through the planing mill and put on horizontally; two coats of tar paper and another coat of hemlock lumber run through the planing mill, tongued and grooved, also put on horizontally. The corners are fixed with a board ten inches wide run to feather edges and nailed in the corner and filled with mortar behind the board. Then we painted the whole inside with a coat of hot coal tar. The benefits of the silo are that you can feed summer and winter in the stable, can have green succulent food all the time, and it takes the place of roots. More stock can be kept on the same number of acres, and the stock is more healthy than on dry feed. On land in good condition is is a sure crop, and can be produced cheaper than any other feed I know of. There is no doubt that curing in the silo renders the fodder more easily digested than any other process of curing. Ensilage is not a perfect food in itself, we never feed it alone; we mix it with cut straw or hay and a little meal. The animals are all fond of it, and it gives a fine, sleek appearance to cattle.

CORN GROWING AND THE SILO.

By T. H. Mason, Staffordville.

The corn crop is becoming a very important one to the farmers of Ontario. A few years ago it was thought that profitable corn growing was restricted to a narrow belt along Lake Erie and part of the Niagara Peninsula. Now it is found by experimenting and by introducing new varieties that corn can be profitably grown in nearly every portion of the Province. The increasing importance of the dairy industry combined with the change in climatic conditions, makes corn a necessity to sucessful dairying. Corn succeeds fairly well in nearly all soils, with the exception of heavy clay, although it succeeds perhaps the best on a warm sandy loam with a calcareous clay subsoil. A favorite preparation for corn in corn growing districts is a clover bed. Manured in spring and plowed early in May, then thoroughly cultivated and harrowed, and plant as soon as the weather is warm enough, usually from May 15th to 31st. Plow sod in the fall, top dress either during the winter or in the spring, then if manure is long plow under as lightly as possible, or if short work up with discs and plant as above. Each of these plans has ardent advocates, and both give splendid results. Of course corn can be grown and will give satisfactory results after other crops than clover, but in any case it should have a good dressing of manure, as corn is a very heavy feeder and requires a large amount of food from the soil.

Varieties. There are numberless varieties of corn in the country, and some succeed better in some localities and on some soils than others. A good general rule to follow is to plant the variety that will grow largest, give greatest yield of grain and mature best in your own locality. The question of maturity is an essential one, as corn does not contain the largest amount of food until in the glazing stage.

Planting. Corn is a semi-tropical crop and requires a great amount of sunlight to attain perfection. If sown broadcast or drilled in thickly while it may give a large bulk to the acre, the food value is so inferior that we cannot afford to use these methods. There are several good plans in common use First, drill in from twelve to fifteen quarts per acre by closing the tubes of the drill all but three. Second, mark land with marker one way from three feet four inches to three feet nine inches apart, then take corn planter and drop a hill every twenty inches. Third, mark with corn marker both ways from three to three and one-half feet apart, and plant with corn planter as for field corn. All of these methods give good results, but if it is desired to thoroughly clean the land at the same time, the third will prove most satisfactory. A good many practical farmers will smile at the idea of corn cleaning land thoroughly, and in fact as corn is generally handled it is one of the best methods of spreading weeds, especially Canadian thistles, that can be adopted; but land can be cleaned, and cleaned thoroughly, by a corn crop if properly handled.

Cultivation As soon as the land is planted harrow well with a pair of light harrows, and give a harrowing every three or four days until the corn is four or five inches high, then start the cultivator, cultivating just as often as possible to kill weeds and preserve moisture in the soil. Keep a sharp lookout with hoe for weeds and thistles that may escape the cultivator, and continue this treatment right through the growing season, and you will be rewarded by a heavy crop of corn and a clean field.

As to the silo, there is the least amount of loss, the greatest amount of food value in this form; it is in the most convenient form for feeding, and it is cheaper than any other mode of handling. It is now generally admitted that preserving corn in the silo is the most economical method. After an experience of seventeen years growing and feeding fodder corn without a silo, and two years' experience with one, I have no hesitation in saying that we can place an acre of fodder corn in the silo cheaper than we can handle it in any other way, and that we receive a greater food value per acre than we can possibly obtain in any other way.

Form of silo. After years of experimenting it is now generally accepted that the round silo is giving the best results, although other forms are very satisfactory. From twenty-five to thirty feet high is found to be better than greater heights. Do not build too large a silo, as, if you have too much surface exposed it will spoil before it can be used. Feed from the top down, and have doors at frequent intervals all the way down. It is better to have two small silos than one large one. Or perhaps better still, put a partition in your large one. Corn properly grown and cut while glazing makes a fine quality of ensilage; if sown too thickly, not properly cultivated, and especially if cut too green, it makes a very sour, poor ensilage of very inferior feeding value. In feeding ensilage, or in fact, corn fodder in any shape, we should remember that corn alone is not a perfect food, and should be fed with other food materials that contain the elements in excess that are deficient in corn; clover hay, pea straw, wheat bean, cotton seed meal, linseed meal and peas are all used. Of course in using these foods we have to consider the comparative prices, which will vary from season to season. It has been estimated that an average yield of corn per acre, well handled, will average sixteen tons of ensilage, although many crops of twenty-five and thirty tons per acre are grown. Over a large portion of Ontario I do not think that any crop can be grown that will show as much food value per acre. I would not recommend feeding a full grown cow over forty pounds per day; other cattle in proportion to age and size. All kinds of cattle do well on it; also sheep. A small quantity is beneficial to horses and hogs, although I would not feed very much to either.

CORN RAISING, AND CORN ENSILAGE AS A MILK PRODUCING FOOD.

By J. C. Harris, Port Dover.

I believe there are as many avenues by which dairy produce may be cheapened as in any other business enterprise. With our dairy schools, experiment stations, and through the press at a small cost, we are able to get the best advice on these matters Surely we should be advancing in this matter of cheap production. By the advent of the silo, we are enabled to get a nutritious, succulent food for our cows all the year round. By using silage as the bulk of our ration in connection with wheat bran, ground oats, oil cake, or other ground grain containing a large amount of protein, so as to form as near a balanced ration as possible, I believe we can produce a gallon of milk or a pound of butter in January, when these articles bring the highest price nearly as cheaply as the same amount in June. By having on hand silage at all times, we are able to keep up the flow of milk during the drouth of July or August, or any other month, to what it should be in the most favorable period, and instead of our cows being dry by November or December, they are paying for their feed and labor and yielding a profit besides, for fully nine or ten months of the year. Various crops are used for silage, but undoubtedly corn is the most serviceable and economical. The silo has no power to add any nutriment to its contents which are put in for preservation, but they do become more succulent and palatable by the fermentation which takes place. Although not a perfect food in itself, it may be used to great advantage for the principal part of the ration for milch cows, but should not be fed exclusively, but in connection with wheat bran or other ground grains, as in itself it is deficient in albuminoids, meat, and muscle food.

Intelligent men endeavor to keep things in their proper relationship to each other. Therefore, the intelligent farmer should endeavor to feed his cows such a ration as is first economical and also well balanced, which will give the best results from the least possible outlay. He cannot count much on increased prices of butter and cheese in the market. The question is, can we cheapen the cost of production? I say we can very materially by use of the silo, by which we are able to feed better a much larger stock, and produce these goods when they are at their highest price.

We hear of many ways of constructing silos, but the cheapest box with the fewest corners that can be made air-tight, is the best silo. You can build with one thickness of

matched lumber, or two thicknesses with tar paper between, or 2 x 4 scantlings. which I believe is the cheapest and most serviceable, especially if cedar is used. The bottom may be cemented, or the clay itself where there is proper drainage does very well, drawing it from the centre into the corners and against the sides all around, making a cup-like bottom. I believe the best covering is a few pails of water before thorough tramping, then covering with any old boards and a few inches of saw dust which preserves the silage.

We will now say a little about corn raising. Probably the most favorable results may be obtained from turning under an old pasture or clover sod just before planting. In all cases the land should be very rich. Often corn is injured by cut worms which are destructive in corn fields which were previously in sod, but I believe this may be obviated almost entirely by plowing in August or early September, and thoroughly working the land in the fall and early spring. For silage, the variety which will yield the largest weight per acre and reach the glazing stage before the frosts come, is the one to select for any district. The glazing stage is when the corn is just past its best condition for boiling in the ear for table use. It is better to err on the side of selecting a variety of small growth which certainly will reach the glazing stage, than a variety of large growth that may not come to the desired state of maturity. The most economical way of planting is to use the common seed drill, leaving it in rows a little less than three feet apart and having the seed deposited not less than three inches deep, which will allow us to harrow the ground once or twice a week until the corn is say 1 ft. 6 in., or 2 ft. high, first with heavy harrows just as the corn is coming through, after with light harrow, never allowing the ground to bake or become hard. After this it is an easy matter to go through with a two-horse spring tooth cultivator very shallow. Frequent harrowings in the start are very important, as they conserve moisture in a dry season, and warm the ground very much in a wet one, but should never be done when the ground is at all sticky. It is a mistake to cut corn too soon, as much of the feeding value is lost if cut before the glazing stage is reached. Therefore, we should endeavor to have it planted in good time in the spring to give it as long a season as possible before frost comes.

In conclusion, I would say we cannot afford to get the impression that we know all about farming, and we cannot afford to farm at all unless we do know a good deal about it. And again, I think the most successful dairymen will bear me out in saying that if we make the dairy profitable, we must begin by filling a good big silo.

THE GROWING AND MARKETING OF ALSIKE AND RED CLOVER SEED.

By Hy. Glendinning, Manilla.

Alsike clover (Trifolium Hybridum) is regarded as a cross between the red and broad leaved clover (Trifolium pratense) and white or Dutch clover (Trifolium repens). It was first introduced into Britain from the south of Sweden about fifty years ago, and began to attract attention in this Province about twenty years later as a valuable crop for its seed, which commanded a high price It was also discovered that Canadian seed was superior to that imported into Britain from any other country. The plant is a perennial, but in this country it is generally treated as a biennial. It will grow upon almost any kind of soil, but the best results will generally be obtained when grown on clean rich clay loam, well underdrained. I wish to emphasize the word "clean," as this crop differs much from red clover, as it makes a very poor cover crop to smother back any weeds that may grow in the land. Therefore, it is necessary to have the land as clean as possible to produce the highest grade of seed. The farmer should be careful to get the best seed possible to sow; it should be large and plump, free from all other kinds of seed and particular care should be taken to see that it contains no white clover, as much of the seed offered for sale has a considerable mixture of the latter. So far no machinery has been invented that will wholly separate those two kinds of seed, being of the same shape, weight, and nearly of the same size. The seeding is usually done in the

spring, sowing the seed along with some kind of grain, or early in the spring on fall wheat or rye, then harrowing it in with a light harrow. It will be found an advantage to keep stock off the fields after harvest as it usually does not get a very heavy top the first season. The following spring the land should be rolled as soon as dry. When the clover is in full bloom it will be found profitable to go through the fields with a sharp scythe and cut the heads of any timothy or high growing weeds that may be found. The proper time to cut the crop is when a majority of the heads will strip easily off the stalk between the finger and thumb. A table is attached to the mower, covered with a false bottom raised a few inches, made of strips to allow the shelled seed and chaff to fall through to the true bottom below, while the bundles are being raked off by hand. When the space below the slats is filled up the chaff and seed is removed into bags. The seed obtained from this chaff will be found to be of the finest quality. After the crop is cut it should be allowed to lie until thoroughly dried. If it should get wet with rain, do not attempt to turn the bundles as the heads will fall off the stalks and the seed will be lost. The wagon rack used for hauling to the barn should be closely covered with boards or strong canvas. The bundles should be picked up carefully with barley forks and placed on the wagon. Do not attempt to use a horse rake to put it in windrows or the bulk of the seed will be shelled off and left in the field. If two or more qualities of seed are grown, such as may result from winter killing which allows weeds to grow up in such places, it will be found advisable to harvest the crop in such a way that the different qualities can be threshed separately. The reason for this will be obvious, as the best seed will be easily cleaned if the foregoing conditions have been attended to, but where it was winter killed foxtail and other weeds are likely to grow up amongst the clover. It will be found much easier to clean the foul seeds out of a few bushels of seed than clean the same amount of foul seeds out of the whole lot. When the seed is cleaned and nearly all of the same quality, it should be all placed in a pile upon the floor and thoroughly mixed before offering it for sale. But if one part is pure and another mixed with foreign seeds, such as white clover or hulled timothy, these lots should not be bulked together, but each offered for sale upon its merits. If mixed the whole lot will likely be reduced a grade or two, and the price correspondingly lowered. The ordinary farm fanning mill will generally be found to clean seed sufficiently well for market, providing it is properly managed; plenty of wind should be used, with a top wire sieve 18x18 meshes to the inch, and a bottom wire screen 24x24 meshes to the inch. These are the usual sizes used. Some years the seed may be larger or smaller and it will be found necessary to vary the size of mesh in the sieves and screens. In many sections of the country there are men who make a specialty of cleaning, and as a rule the best results will be obtained by having it cleaned by them. The ordinary farmer may do just as good a job, but experience is worth a good deal in cleaning alsike seed. Self-catches on land that has been in seed the year previous may give a good crop, but, as a rule, self seeding should be avoided, as white clover is pretty sure to get into the land and destroy future crops of alsike. As soon as the first crop has been harvested, the land should be plowed, as it does not produce much aftermath. To keep it for a second crop of seed the following year usually results in a failure.

Common red or broad leafed clover (Trifolium pratense) is a native of Europe. It is supposed to have been introduced into England from the Netherlands about the time of Queen Elizabeth, but it was not until the close of the last century that it found its way into Scotland and became generally cultivated in Britain as a forage crop. The plant is a perennial, but in this country is generally treated as a biennial. Owing to the severe frosts the plants usually die at the end of the second year. Up to about fifteen years ago there was but little trouble experienced by the farmers of this Province in cutting the first crop for hay and obtaining a good crop of seed from the second cutting, but owing to the introduction of the clover seed midge (cecidomyia leguminicola) which was discovered in the State of New York in the year 1877 and in this Province in 1882, since which time it has spread over the entire clover growing section, great loss has been caused to the farmers who were engaged in raising seed. The ravages of this insect can be guarded against to a considerable extent and a good crop of seed secured by pasturing the clover fields and turning off the stock from the first to the fifteenth of June accord-

ing to forwardness of the season and earliness or lateness of certain sections of this Province. Red clover is so well known that to go into a detailed account of the harvesting and threshing of it would be superfluous, but one matter I would like to impress upon my fellow farmers is the danger of purchasing the seeds of weeds along with clover seed that were unknown to the majority of farmers a few years ago. Such weeds as the curled dock (Runex crispus), English plantin (Plantago lanceolata), ox-eye daisy (Leucanthemum vulgare). These seeds, with the exception of the latter, are difficult to clean out of red clover. Fortunately large sections of the Province are free from them, but farmers cannot be too careful in procuring seed to sow on their farms.

As to marketing, I would say that Great Britain and the continent of Europe are the markets for our surplus alsike and the best sample of red clover. The margin between the price paid the farmer here and that obtained in London and Liverpool is comparatively small when the amount of money invested and the risk involved is considered. Usually the farmer will do as well or better with some local dealer in his own section than looking for a market a distance from home. If a united effort were made by all farmers growing either red or alsike clover seed to produce only the best and in that way improve the standard of the seed exported, a better demand would be created and better prices obtained for Canadian clover seed.

CLOVER.

By John Harcourt, Toronto.

We find all of our ordinary grain and feeding crops divided into two classes, the cereals and legumes. In the former class we find our most important grains, such as wheat, oats, barley, rye, corn, buckwheat, and the grasses and millet. Among the legumes we find some grain crops as peas, beans, tares or vetches, and the clovers Of the clovers, we have the common red, Mammoth red, Crimson, Lucerne, Sanfoin, Alsike, white and yellow. A striking characteristic of the clovers, in fact of all the legumes, is the large amount of nitrogen which they contain, the quantity being about twice as much as that found in wheat, oats, barley and rye. The quantity of potash and lime is also very great, but differing greatly in proportion when grown on different soils. Upon a calcareous or limey soil lime will preponderate, being mostly in the leaf; but on a clay soil potash will be in excess. Another difference between these two classes is that while the legumes take up very little silica, the cereals take up a great deal. This is a glossy, hard substance found on the outside of the stem and leaf. It has been a known fact for many years that although a crop of clover contained so much nitrogen it leaves the soil richer in nitrogen and in a better condition for the following crop than it was before. It was thus seen that they had a separate or distinct means of obtaining nitrogen. This led many to think that clover being a deep rooted crop obtained its supply from the sub soil, by feeding on substances that other plants could not draw from. But during the last few years it has been fully proven that they draw their nitrogen from the air, through the action of minute organisms in the little knots or swellings in the roots. Thus we see that we have an unlimited source from which to draw this most expensive of the three manurial constituents, the air being four fifths nitrogen. The continued growing of clover will cause land to become what is termed clover sick. Nothing has been found to cure this condition of the soil except the growth of cereals or root crops. By doing so we make the most economical use of the nitrogen left in the soil by the clover. It is in a soluble form and will wash out in light soil, and therefore should be used as soon as possible. To receive the full benefit of this increase of nitrogen, the land must be plowed after the first season's crop or crops have been removed. We can hardly realize to what extent the growing of clover would enrich our farms as well as give us the best of hay for our stock, if we would only grow it more than we have been doing. Our heavy clay land has in all probability plenty of potash; our nitrogen is free from the air (for legumes); the constituent that may be lacking is phosphoric acid.

There is no doubt but that there is enough phosphoric acid in the soil, but it may not be in a form which the plants can make use of. If that is the case, we could greatly increase our crop by the use of a good phosphatic manure; for while one element is lacking though all the rest are present in abundance we will not receive a luxuriant crop. Alsike is a surface feeder and will stand wet and will not heave out with the frost as much as the red variety, but there is one objection to it, it gives no second crop. Red clover is deeper rooted, not quite as hardy, but will give a second crop which can be cut for seed. Large or Mammoth clover is a very strong grower, especially adapted for plowing down. Lucerne or Alfalfa, although no hardier than other clover, the first winter after it has become rooted will withstand any amount of frost or drouth when the soil is naturally dry or well drained, and give two or three crops of hay of a good quality in one season, or one crop of hay and one of seed. It is best adapted to land with an open, well-drained sub-soil. Crimson clover is an annual for which seedsmen claim they are having a great call, but which is useless over the greater part of Ontario. Yellow and white clovers are valuable mostly for lawns or permanent pastures.

THE COMPARATIVE VALUE OF CLOVER AND TIMOTHY ON THE FARM

By A. T. Wiancko, B.S.A., Sparrow Lake.

Clover and timothy are two of the most important fodder crops grown on the farm, especially in this country; they form the bulk of the food fed to our animals for the production of either milk, beef, or work. It is, therefore, important to determine which of the two fodders is most valuable for the purpose in view; considering at the same time which is the cheaper to produce and how each affects the fertility of the soil, for it is high time the farmer is looking into the problem of how best to keep up the fertility of his farm without having to resort to the use of commercial fertilizers. Of all the food elements necessary for the growth of crops, and that we are called upon to supply, nitrogen, phosphoric acid, and potash are the most important; these are, therefore, the ones mainly to be considered in keeping up the soil's fertility. Some plants require a more liberal supply of these elements than do others; also some plants have better facilities than others for gathering from remote sources their necessary food. The latter ability depends upon the amount and nature of their root growth. Plants, such as clover, whose roots penetrate deeply into the soil, have an evident advantage, being able to draw food from a considerable depth; while shallow rooted plants, such as timothy, must be satisfied with what available nourishment they find near the surface. Whether we are feeding plants or animals, nitrogen is the most costly food element. About four-fifths of the bulk of the atmosphere is nitrogen in the free state, but this is useless as a food for either plants or animals. Clover belongs to a family of plants (Leguminosæ), other examples of which are the pea, bean and vetch, that have growing on their roots small white bodies, which by virtue of micro-organisms contained in themselves, have the power to appropriate the free nitrogen of the air and convert it into such a form that these plants can utilize it as food for themselves. Timothy has not this power of utilizing the free nitrogen of the atmosphere, but must obtain its supply wholly from the available nitrogen compounds already in the soil. If a crop of timothy be grown and fed on the farm, and manure carefully saved and applied, the soil will have neither lost nor gained in nitrogen. On the other hand, if a crop of clover be grown and likewise fed on the farm and the manure carefully saved and applied, not only the nitrogen drawn from the soil will be returned, but also a large quantity which the clover drew from the air will be left to the soil in a form available for plant food. Thus in the case of the clover, the soil will have gained enough nitrogen to enable it to produce a good crop of corn, potatoes, wheat, or other grain.

Clover, being a deep feeder, its roots penetrate deeply into the sub soil and draw a large amount of phosphoric acid and potash from a depth that the roots of ordinary plants never reach. Timothy, being a shallow feeder, draws all of its phosphoric acid

and potash from the surface soil. In this we can see, that if fed on the farm, and the manure returned to the land, clover enriches the surface soil by the amount of phosphoric acid and potash drawn from the sub-soil, while timothy has not this advantage. If utilized on the farm clover is unexcelled for keeping up the fertility of the land. Owing to its large development of roots, clover brings a great deal of organic matter (humus) to the soil (almost half of its total growth is left in the soil as roots and stubble); it thus has no small effect in improving the tilth of soils naturally deficient in organic matter, making stiff clays more porous and sands more retentive. From what has been said, we may draw that clover is especially valuable as a green manure, because of its extensive feeding habits and the large amount of humus which it brings to the soil.

When compared on an even footing as foods, clover is more valuable pound for pound than timothy, especially when fed to cattle or sheep. Clover is rich in those substances which make beans what they are generally considered to be,—a strong food for a working man. By the chemist these substances are called "albuminoids," or "protein." They contain practically all of the nitrogen in the plant, and are the chief materials in lean meat and the curd of milk. The remaining organic substances of the plant, viz., those that contain no nitrogen, such as starch, sugar, and fat, are called "non-albuminoids" or "non-nitrogenous," and are valuable chiefly for keeping up the heat of the animal body. But as all plants contain an abundance of these non-albuminoids, they need not be considered in determining the value of fodders. A food is considered rich in proportion to the amount of digestible albuminoids that it contains; in other words, the greater the proportion of digestible albuminoids to digestible non-albuminoids, the more valuable will be the food. Clover hay, fed alone, is a well-balanced ration for a milch cow or a beef animal, containing about one part of digestible albuminoids to six parts of digestible non-albuminoids: in other words, it has a nutritive ratio of about one to six. Timothy hay is not so rich, having a nutritive ratio of only about one to nine (calculated from a table of composition by Prof. Warrington). According to these figures, two pounds of clover hay are worth three pounds of timothy hay. The manure resulting from the two fodders, if made under the same conditions, will show a similar comparative value,—two tons of that from clover hay being worth three tons of that from timothy hay.

It is thus quite evident that clover is of too much value as food for both animals and plants to allow of its being sold off the farm. If you must sell hay sell timothy; it not only has a readier sale and a higher price on our markets, but is worth less on the farm either as food or manure. It is a lamentable fact that so many farmers have not yet learned how to make good clover hay; and until they do they will not be able to appreciate by experience its real value over timothy.

SECURING A CATCH OF CLOVER.

By Adam Beatty, Wilton Grove.

Great care should be taken that clean seed be secured. If absolutely clean seed can not be had, get some as nearly clean as can be found. I have three patches of wild-morning-glory or bind-weed on my place that undoubtedly sprang from seed sown along with grass-seed, which I expect it will take me years to get rid of. Weeds grown from seed sown with grain may be checked the first fall and perhaps killed while the plant is young and weak, but weeds which have sprung from seed sown along with grass-seed, get at least two seasons growth before they can be checked. The amount of seed to sow will depend a good deal on the nature of the soil. On damp light soils perhaps five or six lbs. per acre is sufficient, but on the average loam possibly seven or eight lbs. would not be too much. Clover should be sown as early in the spring as possible. If seeded with fall-wheat, it is better sown before the frost is out of the ground, so that it may get the advantage of the first growing weather. A month's start is very important, I might

almost say, all-important, to young clover. We all know how damp the ground is on the surface during the early spring months, the very time when clover needs it there. When its roots are six inches to a foot or more in length, the clover is quite indifferent to surface moisture. When clover is to be sown with spring grain, then the field to be seeded down should be sown first if possible. Clover seed needs a fine seed-bed. Such small seed has no chance amongst clods. Land worked up fine will stay moist a much longer time than if left in a rough lumpy condition. I would like to emphasize this point. Make the ground fine. The clover plant is like every other plant in the world in one respect at least, it must have moisture. From the time the seed is in the ground to the end of its existence, it never ceases to need moisture. It is very important to give clover a good start. The first ten days, or two weeks, is generally the testing time as to what the catch is to be. The clover sometimes dies off later on, but generally speaking, if it comes up well, we may be tolerably certain of a good catch. Why is this? I think it is because the conditions favorable to the seed sprouting and coming up, will continue to be favorable to its after growth. If we prepare the soil with that sole end in view, other conditions being favorable, we may safely assume we have done our part towards securing a good catch. The seed should be covered. It is not enough to throw the seed on the ground. It should be worked into the ground. A seed lying exposed to the sun and wind will stand a poor chance in a time of drouth. It is better also to cover it as soon after the ground is first worked up as possible. Thin sowing of the grain with which clover is seeded is a help towards securing a good catch. I noticed in a late number of the Farmers' Advocate a correspondent speaks of such a crop, as a nurse crop. The latter is in no sense a nurse or help to young clover. It would grow much better if sown alone. In fact if the soil were very badly worn out, I am inclined to think it would be profitable to adopt that plan. The ground should be harrowed smooth after being plowed in the fall, and the seed sown towards the end of March on the frozen ground. I am persuaded that this is the surest way to obtain a good catch of clover on worn out land. If any one doubts this, let him examine a crop of fall wheat that has been winter killed in spots, and he will find the clover and weeds will be thick and rank where the wheat is thin, and where the wheat is very thick and heavy the clover will be correspondingly weak and puny. If you were to ask the ladies why they prefer a south window in which to set their house plants, they would very quickly tell you the plants needed the sun They will live in a north window, but they won't grow and thrive and bloom unless placed where they can get the sunshine. A thick heavy crop of grain not only shades the clover from the sun, but it robs it of much needed nutriment and moisture, especially in a dry spell. In the struggle for existence, the stronger prevails, the weaker goes to the wall. Lastly and chiefly, the ground should have a plentiful supply of humus or vegetable matter in order to ensure a good catch every time. Occasionally we have springs so favorable for growth that a good catch is almost a matter of course in every field where seed has been thrown; but these are exceptional seasons and we need not expect them often. We must prepare our land for the most unfavorable seasons in order to be safe. If we could get the land back to the condition it was in when the woods were first cut away, we need have no fear then. It has been said of new land, "Just tickle it with a hoe and it will laugh itself into a crop." New land is easier to plow than land that has been cropped for some time, easier to cultivate; a single stroke with the harrow is as effective on it as two doubles on old land, and then the growth that is in it! Anything from a clover to a pumpkin will start from the word go and get there everytime. I think the main point is to supply an abundance of humus to the soil. How can we get back this condition? I think the simplest way would be to seed down often. Instead of cropping a field with grain for five or ten years, then seeding down, and for fear of not getting as good a catch again, keeping the field in hay for five or ten years more, we should seed down with clover or timothy every three or four years, and plow under a field of clover or timothy sod every three or four years or oftener. Then we would soon see the land become mellow, friable, and easily worked; soon there would be no difficulty in getting a fine mould on top; clover would then catch without any difficulty and go straight ahead.

CARE OF GRASS LANDS.

By Andrew Elliot, Galt.

Grass is undoubtedly the most important crop grown on the farm. Strange to say it is also the most neglected. Grass will grow everywhere. Let the land be idle and under the worse conditions, grass of some kind will eventually cover the surface; but such grass is as a rule neither the best nor the most profitable. Too much of our grass lands are covered by grasses of this sort. Seeded down after the land has been impoverished by grain growing, with a scant seeding of mixed grasses per acre, left to struggle for existence with grain, thistles, and other weeds, is it a wonder that a good catch is comparatively rare? The subsequent treatment is equally vicious. As soon as the grain is removed, stock is turned on, the young plants are grazed close down to the crown to the serious hurt, if not the destruction of the young plants; the roots are left so unprotected that they are liable to freeze out during the winter, and what survive the vicissitudes of winter and spring are so weakened that a poor crop of pasture or hay is the inevitable result. Then immediately after haying, the same system of close pasturing is followed, and in time nothing but the hardiest natural grasses remain. If not already in good condition previous to seeding to grass, the land ought to be enriched and brought into the best condition mechanically, and liberal seeding applied, relying mainly on the clovers, a mixture of say ten lbs. of common red, three lbs. alsike and five lbs. timothy, being none too much. Six pounds of orchard grass may be added; in that case sow six lbs. red clover and three lbs. timothy and three lbs. alsike. The grain ought to be sown thin in order to give the grass every chance. The young grass should be pastured very little, if at all, after harvest; the aim being to allow the young plants to obtain full possession of the soil and also to have the top to form a protection from the frost of the winter. Grass intended for hay should on no account be pastured in the early spring, nor should stock be turned on to pasture until a good strong growth is obtained. Neither should lands be stocked so heavily that the grass will all be consumed, a certain amount of natural mulch from superfluous grass being very desirable. A top dressing of from 100 to 150 lbs. of gypsum applied in the early spring will always be beneficial on meadows composed principally of clovers, in many cases doubling the crop. The objection will be put forward, are we to let our cattle go without food in order to follow the above system? The question is shall they want grass now or go without hay and pasture next year? By following the plan outlined, our lands will become richer as the years roll on and their stock carrying capacity will be materially increased. By following the old hap-hazard style, our grass management fails to accomplish the end for which it is intended. It does not materially enrich the soil and is unsatisfactory in the extreme.

FLAT CULTURE FOR ROOTS, LUCERNE AND ORCHARD GRASS.

By R. Stutt, Forest.

In these times of keen competition for the meat markets of Britain, any improvement in the kind of pasture, or any betterment in the tillage of roots that will give a much larger yield is deserving of consideration. If I were asked to state in brief what is the basis of successful and profitable farming, I would say raise and keep on the farm until fat, at least twice, and in some cases three times as many cattle, sheep, and swine as we have been doing. Sell no coarse grains at losing prices, but grind and feed them all. At present, this is sure to make money and the farm will soon produce more. If this is done success is assured. I know that to a farmer loaded with immediate liabilities, this may seem too far off, but I verily believe success can come in no other way. If we cannot in one year do all we would like to, still aim high, and it is astonishing how soon things will mend. To that end we must learn to grow a large quantity of food to the acre, such as corn, mangels, lucerne, etc. In Lambton county we grow great quantities

of mangels; of turnips few. Our manner of cultivation is as follows: The land is plowed in the fall and is fairly rich and underdrained. Any kind of rich soil will do, but good fine clay loam with a good vegetable mould so as to give the seeds a start is the best. Old land is better than new, as there is less danger from the grub. Years ago, we used to drill up our land and sow on the drills, thinking that plan best. That plan has been discarded long ago. Some adventurous spirit put them in on the level and good crops were raised. This plan grew in favor, and now almost everyone sows them in that way. The old theory that they would strike the sub-soil and be short is exploded. If there is a hard sub-soil, the plants will just stand that much higher out of the ground. They are easier hoed on the level; there is no trouble with the plants falling over, and the cultivator can be used from the first; thinning is all we need a hoe for. If there is a dry spell when the plants are coming up, they have a far better chance to obtain moisture than if the seed was sown on the top of a drill. I know it is said that capillary attraction draws moisture to the top of the drills, at the same time we have all seen a plant that happened to grow in the furrow thriving and looking well when those on the top of the drills were dying with heat and drouth. Indeed, on raised drills I have seen them dried to death, but never when on the level. The reason is obvious. But it is argued if capillary attraction draws the water as near to the surface on top of a drill as on the level, then why will not the plants do as well on top of the drill having a deeper soil to grow in? My answer is, there is more moisture on the level to start them. They are easier cleaned; they will grow larger and only from say three to five inches in the ground; can be pushed out sideways easily without breaking; they will be smoother, larger, and better shaped. It is a fact mangels will dry out and die on top of a drill when they will not on the level. At least I know it is so in Lambton. I do not say positively that this system is better under all circumstances; climatic conditions and soil sometimes make a great difference.

We sow with our common grain drill twenty-one inches apart, about four pounds of seed to the acre, hoe out to about fifteen inches apart. I think the yellow intermediate is the best variety. They sit almost on top of the ground and are easily taken up. The large reds have more roots and grow deeper into the ground. A number of farmers cross harrow their mangels, carrots and turnips. Of course this is done before thinning, when they are about the size of cabbage plants. The principle is the same as in harrowing corn; it makes them grow, keeps weeds down, and they are easier cleaned. Mr. A. Rawlings, Forest, than whom there is no better or more successful farmer in Lambton, reports that he experimented with four acres. One and an quarter acres were put in on the level plan; they were harrowed twice, then hoed once; land clean and very rich; he had 1,100 bushels on the one and a quarter acre. The remaining two and three-quarter acres were put in on drills in exactly the same soil. The drills dried out; result only 300 bushels per acre from the two and three quarter acres, and they were in first. Mr. Rawlings gives us another very interesting experiment. He says, "I had a very rich piece of land in mangels. I measured just one square rod out of it. I and a hired man took the mangels up, cleaned them, and had them weighed at the town scales in Forest which were near by. On that one square rod there were 1,170 pounds, or an average of ninety-three tons per acre." Of course this was an exceptionally good crop. I have not weighed my mangels to know exactly what I have grown, but I can give it by the waggon load. I had just an acre, four rods by forty, very rich land, an old beaver meadow and well drained. There were on the acre one row of beets, a little bed of tomatoes, a little bed of water-melons, and sixteen mangels for seed,—in all perhaps five square rods. We had on the acre minus the above forty six big loads. We set a row of mangels up when the wagon box was nearly full and filled up as much as we could every time. These were put in flat, but it was a piece of good land. It might have grown more but that the grubs thinned them in some places. Some of my neighbors had crops just as heavy.

If a farmer can raise from thirty to forty tons of mangels, twenty-five tons of green fodder corn, as much of lucerne to the acre, and not forget to seed down regularly with clover, that greatest of all fertilizers, then the question of cattle feed and keeping up the fertility of our farms is in a fair way to be satisfactorily settled. It is a self evident fact

that unless we put as much back into the soil as we take out of it, the land is becoming poorer. Plain as that fact is, it would be worth tens of thousands of dollars to Ontario if it were thoroughly understood and appreciated. Why is it that the once thickly populated and fertile New England States are now almost barren and vacant? Because the land was cropped to death. Why is it that the empire of wheat in America is steadily going westward? Because in nearly every instance the soil is slowly but surely becoming poorer. This must be put a stop to. In fact I think it is put a stop to, for unless there should be a failure in the world's crop of wheat we cannot produce it cheap enough to complete in the wheat markets of the world. Before 1870 Indian wheat was unknown in Europe. In 1885 the wheat fields in India produced 260,000,000 bushels, about fifteen per cent. of the world's crop. The area under cultivation now in India is over thirty million acres, about one-fifth being the districts smitten with famine and pestilence. Agricultural labor does not exceed in cost five or six cents a day, and the rent of the land is very little i ideed. A few years ago it would have been considered impossible for India to become a wheat growing country on a large scale. Perhaps the low price of wheat may do us good by forcing us in a measure into live stock and thus prevent the impoverishment of our soil. How often when the crop has failed have we heard it said only for the drouth, or frost, or rain, or midge, or rust, or something, the crop would have been good, often over-looking the true cause,—exhausted soil. A poor, sickly, unnourished man who only makes about two spoonfuls of blood a day, catches every epidemic that comes along. Just so with wheat; if the land is good it can generally grow away from its enemies.

Our experience with lucerne is only beginning. We have found it to be one of the best clovers on land that is well drained or has a dry sub soil. We seed down with a grain crop, and sow about ten pounds to the acre; in the fall keep everything off it, so as to let it cover the ground; it is tender the first winter. After that it will hold its own against all comers. Lucerne is a perennial; you will not get much if any crop the first year, but do not be discouraged and plow it up. If the plants are on an average of eight to ten inches apart, and four to five inches high, you will probably have four tons to the acre the next crop. The next year it will be as good as ever it will be, probably five to eight tons to the acre of hay, according to the quality of the land. If cut three or four times for soiling, it will give from twenty to thirty tons of green feed to the acre. The only grass that is early enough to ripen with it is orchard grass, and both must be cut when they come into blossom, if not, they soon lose their moisture and turn into woody fibre. This must be guarded against, as not only is the hay little good, but there is a danger of the dry fibre lodging in the cattle causing serious trouble or death. Very hungry cattle must not be let on while it is green, and especially if it is wet, as it is likely to cause flatulency, being so soft and rank. If either orchard grass or lucerne is sown with timothy and left until the timothy is ripe, they will be little or no good. If sown for pasture you can sow as many kinds as desirable. Dry summers are bringing orchard grass and lucerne more into favor. Some cut it three times in the summer of 1896, which was an uncomonly dry summer with us. In an average year it gives four good cuttings. When everything else fails through drouth, orchard grass and lucerne grow right along. They are going to supply a long felt want, namely, a grass that will not fail in a dry time as other grasses do, often just when we want to finish our cattle, and also a grass that will grow as much pasture on one acre as upon two sown with ordinary pasture grasses. We must recollect also, that they send down their roots to a great depth, ten to fifteen feet, and even more in a very dry time, and thus bring fertilizing properties to the surface and within reach of cultivation. In a few years by judicious management they will convert a poor soil into good land. Sheep are fond of lucerne, but if allowed to eat it too close they will eat the heart out of it and kill it. Pigs will fatten on it. It will not kill out the first winter; the danger is over then. So far as I am able to judge the great value of lucerne will be for soiling, pasture, and as a fertilizer. When properly understood I think these two grasses will greatly benefit if not revolutionize the dairying and fat cattle interests of Ontario.

GROWING CARROTS.

By R. R. Sangster, Lancaster.

The essential points to observe in the cultivation of carrots is first the sort of soil, second, the preparation of the soil, third, the sorts of carrots and the amount of seed per acre, fourth, the hoeing and harvesting. The cultivation of the carrot is comparatively simple when compared with that of other roots The greatest difficulty is in securing a good beginning and giving them a start. The carrot, unlike most root crops, is very hardy. When once well started they will withstand more unfavorable weather than any other hoe crop, being less liable to the ravages of insects that prey on other crops and less liable to be injured by frost or dry weather. The soils best suited for carrots is a black loam with clay subsoil, or clay loam, or sharp gravely loam made rich with manure, as they are heavy feeders and take about the same amount of manurial constituents from an acre as mangels. Almost any of the soils in this Province are well adapted to the growth of carrots. Take land well drained with surface drains, or if underdrained all the better; a sod field from which a crop of peas has been harvested is an excellent preparation. After harvest plow lightly or gang plow three or four inches deep, and when dry in a day or two or in a week, harrow thoroughly until all grass and stubble are on the surface. Let it remain in this condition if no grass appears; if so, harrow again. Then about the middle of October apply a good heavy coat of manure, well rotted, and made as fine as possible, at the rate of thirty or forty cart loads per acre, spread evenly over the surface and plow under six or eight inches deep (manure from the hog pen is most suitable). Be sure that all surface water is drained off in order that the land may dry as early as possible in the spring. Very early in the spring, as soon as the land is dry and will work well, pulverise it as fine as it can be made, harrow lengthwise and crosswise until the surface becomes thoroughly smooth, then plow crosswise and let it remain that way for a day or two to dry and warm. Again harrow until all lumps are broken and the surface made smooth and as fine as possible, then commence and raise the drills from 24 to 28 inches apart; rake the surface of the drills with a garden rake or a very light roller, or where a drill is used that sows two drills at once, rolling will not be required. Have the seed ready and make sure it is fresh and rubbed clean. The carrots best suited for a fodder crop and those most easily harvested, and also those which give the largest yield per acre, are the intermediate or Improved Short White, White Vosges, and White Belgian. There are several varieties, but those three will be found to give the best results. Sow at the rate of 1½ to 2 pounds per acre, which will be thick enough if the seed is fresh and good. It is advisable to have them thick as they require to be thinned by hand. As soon as the young plants can be seen, or as soon as the rough leaf appears, start the scuffler between the drills and cut up to within two or three inches of the plants. Then with a sharp hand hoe trim the remainder, or the shoulders of the drill close up to the plants. Commence thinning before the young plants get two much of a start, which causes them to become spindly and checks their growth. Thin by hand from four to eight inches apart and avoid as much as possible pulling them down. In a few days all weeds that have been pulled and cut will have died and disappeared. Again run the scuffler through the drills and hoe close up to the carrots with hand hoe, which will be all that is required until they get well started or about six or eight inches high. They should then be banked or moulded up which will cover all weeds that may have sprung up. Do not mould too sharp, unless the season is somewhat wet. I find from experience that carrots, unlike mangels or turnips, require the moulding, as they draw largely from the subsoil and not so much from the surface as other roots. This is all that is required until the harvesting, which can be left quite late in the season. Carrots, unlike mangels, withstand the frost on account of the heavy top which protects the roots, enabling them to remain in the ground until the end of October with safety. I find the most expeditious way of harvesting them is to pull when dry and lay them crosswise on top of the drill. Throw three drills into one, which gives two clear drills for the horse and cart to come along, then with a sharp knife or sickle commence and top. Pick up each carrot with the

left hand and trim off the top and throw direct into the cart, being careful that no tops or leaves adhere to the roots, for they are sure to heat and rot, which causes too much moisture in the root cellar, and if a large quantity is stored will cause them to rot at the crown and start them to grow, which should be avoided if possible. If the above methods are closely observed, with a favorable season the grower will have no difficulty in producing from twenty to thirty tons per acre of one of the most valuable root crops produced on the farm.

PREPARATION OF THE SOIL FOR FALL WHEAT.

By Wm. Rennie, Farm Superintendent, O. A. C., Guelph.

On the Ontario Experimental Farm at Guelph the method used in preparing pea land for fall wheat has given during the past two years remarkably good results. The peas are grown on sod-land, which is plowed, thoroughly harrowed and cultivated the previous fall. In the spring, before sowing, coarse barn-yard manure is applied at the rate of fifteen loads per acre, and mixed with the surface soil by shallow gang plowing, harrowing and cultivating. Immediately after the peas are harvested, the land again receives surface cultivation by gang-plowing, harrowing and cultivating at intervals with a broad-share cultivator. By this method the weeds and weed-seeds are destroyed. Before sowing fall wheat the soil is loosened to a depth of six or seven inches with a grubber (an ordinary cultivator with narrow chisel-pointed feet). To do this work thoroughly three horses are required. On heavy clay land a subsoil plow might be necessary to loosen the soil to a sufficient depth. In no case should the decomposed vegetable matter be plowed under with an ordinary plow and covered with the crude subsoil in which plant-food is unavailable. Fall wheat is sown (drilled) in the last week of August, at the rate of less than one and a half bushels per acre. In the following spring as soon as the land is dry the crust is broken with a horse-weeder or harrow.

In preparing clover-sod for a pea crop that is to be followed with fall wheat, we plow the land in August to a depth of three inches, and then roll and harrow thoroughly. In about two weeks the sod is cut-up with a disc-cultivator twice in a place by half-lapping. The soil is given frequent harrowing and cultivating until October, by which time the sod is thoroughly rotted and the plant food made available. In order to prevent the plant food from escaping by evaporation or leaching away during the winter, the land is ribbed to a depth of about four inches in drills twenty inches wide, with a double mould-board plow. This puts the vegetable mould in the centre of the drills, where it is not liable to get washed away with rain and melting snow which runs off in the furrows. These drills are easily levelled by harrowing and cultivating before sowing peas in the spring. There is an objection to applying coarse manure to the land in winter, and early spring weed seeds are not then destroyed in the manure; consequently they will grow up with the peas and make the crop look unsightly. In future we intend leaving the manure in the barnyard undisturbed until the peas are harvested. It will then be hauled directly to the field, spread and lightly gang-plowed; then thoroughly harrowed and cultivated before sowing fall wheat.

Worn-out land, which lacks plant food so much that it is difficult to get a catch of clover, can be restored by sowing a mixture of peas and buckwheat. This should be done in the beginning of May at the rate of one and a half bushels of peas and one peck of buckwheat per acre. At the end of July the crop along with ten loads of barnyard manure per acre should be plowed under to a depth of three inches. With frequent harrowing and cultivating the green crop will be thoroughly rotted and mixed with the surface soil and be in good condition to sow fall wheat at the end of August. A bare summer fallow in the hot summer months is most destructive to plant food.

WHEAT GROWING.

By Henry Pearson, Weston, Ont.

At the request of the Executive Committee of the West York Farmers' Institute, I have prepared the following paper on the cultivation of the wheat crop. I shall only deal with a few of the most important points, and shall divide it under the following heads: First, the soil and preparation; second, sowing; third, best varieties.

A very large proportion of the cultivated area of Ontario is suitable for wheat growing; the main thing necessary is to have the land thoroughly drained. If it is not drained naturally, it must be done artificially. I have seen some of the finest crops of wheat grown on reclaimed and dyked land as, for instance, the borders of Lake St. Clair, which previously were covered with water. There is one thing certain, however, you cannot expect to grow wheat on a wet subsoil.

At present prices for wheat it will not pay to summer-fallow, but if it is necessary to fallow start the work the previous fall by plowing the soil a trifle deeper than it was plowed previously, and after the spring opens, say about the 1st of June, apply manure and plow lightly with a broad share plow and then harrow thoroughly. After this I would not plow any more until ready to seed furrow, and if any thistles or weeds showed themselves cut them off with a broad-toothed cultivator, or what I used to find better still, a gang plow with wide shares, with the mould board taken off. But remember one thing, you cannot roll or harrow two much if you do it when the ground is dry. Seed furrow light; you then have what is necessary for a wheat crop, a fine tilth on top and a solid bottom. But what I consider is better preparation for a wheat crop, is a clover sod turned down in July. Plow say six inches deep, but as regards depth I would be guided by the soil, roll with a heavy roller and work on top with harrow and cultivate as necessary. I have seen good crops on a timothy sod treated this way, also on stubble lands and potato land; but I would like to impress one thing on the farmers: never put in a crop of wheat until thoroughly satisfied you have a good seed bed, for I am satisfied a great deal of the cause of the low yield per acre is due to the fact that lots of lands are sown with wheat that are not in proper shape.

Now a word about sowing. Have your ground harrowed as fine as you wish it to be. Do all your harrowing before you drill, and let the drill run just as light as it will and cover the grain, and if sown before the tenth of September, 1½ bushels per acre is sufficient seed, but if later than that I would sow one peck more.

Now as to what varieties to sow. After several years of observation I am satisfied that the red and bearded varieties of wheat are the hardiest and, as a rule, the straw of these kinds is the best, not being so stiff and hard as the white varieties, and unless I had a sheltered situation I would not sow white wheat.

GRAIN SMUTS.

By D. W. Beadle, Toronto.

The substitution of smut for grain goes on increasingly year after year until the loss which farmers sustain from it becomes a serious matter. Take as an example the loss said to be sustained by the farmers of the United States in their oat crop alone. Experts, after much careful examination, put the annual loss during the years 1890, 1891, 1892 and 1893 at eight per cent. of the entire crop.

Bulletin 59 of the Ontario Bureau of Industries gives the oat crops for several years and prices obtained; from this we see that the average annual oat crop of this Province for the years 1891, 1892 1893, 1894 and 1895 was 70,644,441 bushels, and the average price obtained therefor $22,606,831. The loss we sustain from oat smut

cannot differ materially from that of our neighbors to the south of us. At the same ratio our oat crop for these five years would have been an annual average of 76,787 435 bushels had there been no oat smut; and the amount received each year $24,571,979. Thus we see that during these five years the farmers of Ontario sustained an annual loss of $1,965,148; or a total for the five years of $9,825,740. This surely is a serious loss; can it be prevented?

What is this thing that we call smut—this thing that is costing our farmers nearly two millions of dollars every year? Instead of grain we have a black powdery substance that crumbles into seeming dust that the slightest breath of air carries away: and we stand in dumb helplessness before it, did stand helpless until men of science,—men of whom we often thought and spoke so slightingly,—taught us that it was a plant, taught us how it grew, and when and how to kill it. Plants are either flowering or flowerless; of these some are parasitic, that is, feed at the cost of other plants, consuming what other plants had prepared for their own nourishment. The smuts are flowerless parasites. Oat smut is parasitic on the oat plant, wheat smut on the wheat, barley smut on the barley, corn smut on the corn plant; each smut grows on its own and on no other grain. The life histories of these smuts vary so little that the story of the life of one will give the key to that of all the rest.

Life History of the Oat Smut (*Ustilago avenae*). The black powder, which takes the place of the grain is composed of living organisms capable of producing growing plants. They are called spores. Under the same conditions of moisture and heat that are favorable to the growth of the oat grain, these spores also germinate and grow. Lodged within the husk or adhering to the grain, they are sown with the seed. When the oats germinate and begin to develop into little seedlings, these spores send out a germ tube which penetrates through the first sheath leaf of the young oat plant. But if the seedling oat develops so rapidly that it has sent out leaves a short distance beyond the sheath before a germ tube has penetrated the first sheath leaf, then it is too late for the germ tube to effect an entrance into the oat plant. The germ tube that penetrates the sheath leaf sends out delicate branching threads (mycelium), from which sucking branches enter the cells of the oat plant (haustoria), and draw thence nourishment for the growth of the parasite. Thus the parasite grows within its host with the growth of the oat plant; at length it reaches the inflorescence and there, feeding on what would otherwise have become an oat grain, develops in its place myriads of its own organs of reproduction, which are called spores by way of distinguishing them from those of flowering plants which are called seeds. These spores are very small, about the three thousandth part of an inch in diameter. Small as they are, they are endowed with great vitality, having been found to be capable of germinating when six years old.

How to kill these spores. In the year 1887 J. L. Jensen ascertained that the grain of oats and of wheat retained vitality although subjected to a degree of heat that killed the smut spores. His method of doing it is substantially the following: Provide, first, a wire basket, with close fitting cover, having a fine mesh that will retain the grain. Second, a good Farenheit thermometer having the bulb protected. The large dairy thermometer will answer well. Third, two wooden vessels holding forty gallons each. Fourth, a clean floor or canvas, on which to dry the grain. Fifth, a plentiful supply of hot water. The wire basket to be half filled with the seed grain, enough hot water to be put into one of the wooden vessels to admit of submerging the wire basket completely and to spare, the better to enable the operator to keep the water at a uniform temperature, never less than 120° nor more than 125°. The basket is to be plunged beneath the water, there rotated or twirled, then lifted out for a few moments, again plunged and shaken in the water and lifted out, repeating the operation several times in rapid succession until every kernel is well wetted and warmed. Meanwhile an assistant has provided a like quantity of hot water in the other barrel, which must be maintained at ten degrees higher temperature, not less than 130° nor more than 135°, preferably at 133° as nearly as possible, during all the time that the operator is dipping and twirling his basket of grain in this hotter water, which he should do some ten times, occupying some ten or fifteen minutes. It is very important that the thermometer be

most carefully watched during all the operation, and if the water is cooling at any time below the proper temperature, hot water must be added and the whole thoroughly stirred so that the heat be evenly distributed throughout, then tested to see that the right degree of heat has been obtained. In doing this let the basket of grain be removed from the barrel lest it receive water too hot and the grain be killed. Should too much hot water have been used, it can be cooled by the use of cold water treated in the same manner. The grain must not at any time be subjected to heat greater than 135°. After treating the grain in this manner it should be drained and spread out while yet hot in a layer not more than three inches thick to dry.

It is most important to be very careful to keep within the temperature limits given; greater heat would injure the grain, less would not kill the spores. It is sometimes desirable to treat a large quantity of seed. This can be more rapidly done by modifying the operation in the following manner, by which it is possible to treat five bushels at a time: First, a barrel holding about fifty gallons. Close to the bottom bore a hole an inch and a half in diameter, cover it on the inside with wire screen that will keep in the grain, and make a plug to fit the hole tight. Second, a piece of stovepipe of six inches diameter perforated with four rows of holes, equidistant between the rows and between the holes, running from the bottom to within five inches of the top; upon the bottom fasten three equidistant supports five inches high; the pipe to be long enough to stand on the bottom of the barrel and extend five inches above the top. Third, a support upon which to set the barrel so that a vessel can be placed under the plug to catch the water. Fourth, provide a supply of hot water convenient to the barrel, and old carpeting or something that will keep in the heat. Having placed the stove-pipe in the centre of the barrel and fastened it securely, the grain is to be poured in around the pipe in quantity of five bushels at a time; then pour about fifteen gallons of water at a temperature of not more than 130° or less than 125° into the stovepipe, push any floating grain under, and cover the barrel to keep in the heat. At the expiration of ten minutes pull out the plug, catch the water, stir into it enough hot water to raise the temperature of the whole body of fifteen gallons to 133°, three degrees higher than before; pour this into the stovepipe, cover and let stand for ten minutes; again draw off the water and again raise the temperature to 133°, and pour it into the pipe, and cover, and at the expiration of ten minutes draw off the water, take out the grain, and at once spread it in layers not more than three inches thick to dry.

These hot water treatments are efficient to kill the spores of oat smut and of the stinking smuts of wheat.

To some it may be more convenient to kill the spores of the oat smut by the potassium sulphide treatment. Messrs. Kellerman and Swingle in 1890 promulgated the efficiency of potassium sulphide in destroying the vitality of the spores of the oat smut, known to botanists as *ustilago avenae*. This material can be had in fused cakes of most druggists, costing from 25 to 40 cents a pound according to the quantity wanted. It is called by some liver of sulphur, and should always be kept in a glass bottle or jar tightly closed.

Having provided some wooden vessel, say a barrel, holding about forty gallons, pour into it twenty-five gallons of water and dissolve it in a pound and a half of potassium sulphide. When it is all dissolved stir the solution thoroughly with a wooden paddle. Never use any instrument of metal in handling potassium sulphide Pour in gradually three bushels of oats, stirring the solution at the same time, so that every grain may be wet. When all has been poured in, the grain should be considerably below the surface, and allowed to remain for twenty-four hours, stirring it meanwhile thoroughly several times; then taken out, washed with pure water, and spread out to dry. Three batches of grain can be treated in the same solution. Less or more of the grain will be sprouted which makes it more difficult to dry than when treated with hot water. Washing with pure water materially helps the drying. Some advise to sow before the grain is quite dry, but this can be done only when sown broadcast.

May not prevention be better than cure? It has been stated already that the spore tubes cannot penetrate the young oat plant after its leaves have grown beyond the sheath.

Can we not enable the young oat seedling to get the start of the smut spore by stimulating its growth in its earlier stage by drilling in a fertilizer well supplied with available nitrogen? No experiments designed to test this question have come to my knowledge, but it may be noted that Mr. F. M. Selby, an Ohio farmer, who was supplied with a portion of the seed sown at the Ohio experiment station, drilled in a fertilizer with it. He reports 3.24 per cent. of smut as against 8.80 per cent. at the station. This seed received no treatment at either places. Both the hot water and potassium sulphide methods are efficient in killing the smut spores and result in an increase of the oat crop greatly beyond the gain derived by the substitution of sound grain for smut. Abundant tests have shown that this gain is very considerable, usually more than enough to pay for the cost and labor of treatment, so that the farmer gets not only oats instead of smut but enough more than that to fully pay for the treatment. In this case surely it is cheaper to take some trouble to kill the smut than to risk the loss of eight per cent. or more by a growth of smut, the amount of which is often much greater than is suspected from the fact that at harvest time the smut has nearly all been blown away.

The Wheat Smuts. Botanists tell us there are three kinds of smut that injure the wheat crop, two of these are known as "bunt," "stinking smut," and the other as the "loose smut of wheat." The kind of stinking smut that is the common one in this country is called *Tilletia foetens*, the less common *Tilletia tritici*, and the loose smut *Ustilago tritici*. Both of the bunts or stinking smuts grow in the manner already described and are controlled by the same treatments, and to the farmer therefore are practically as one. Once introduced they increase with each succeeding crop until fifty, yes, and even seventy-five per cent. is only smut, and the sound grain so contaminated as to be useless both for flour and seed. As already stated the hot water used in the methods that have been described is thoroughly efficient to kill the spores of the stinking smuts. The blue-stone (copper sulphate) treatment has long been known, and heretofore the method has been to spread the grain, say on the barn floor, and sprinkle on the solution made by dissolving one pound in three gallons of water, turning the grain with scoop shovel that every kernel may be thoroughly wet. It is thought that better results are obtained by dissolving one pound of bluestone in 24 gallons, stirring the solution so that it shall be of equal strength throughout, then pouring in the grain slowly, stirring the solution at the same time, and not putting in any more seed than will be covered to the depth of several inches. The grain should remain in the solution for twelve hours. Have ready some lime water made by slaking one pound of quick-lime in ten gallons of water; take the grain out of the blue-stone and immerse it in the lime water for ten minutes and then spread out to dry.

Loose Smut of Wheat (*Utilago tritici*). The spores of this are killed by first soaking the grain for four hours in cold water, then setting it away in wet sacks for about four hours more, then putting the seed in the wire basket already mentioned, only enough at a time to half fill it, and plunging it into hot water at 132 degrees, shaking and twirling it for only five minutes, and then spreading it out to dry. Some of the seed will be injured, therefore about double the usual quantity should be sown. The crop will be clean and can be used for seed the following season.

Loose Smuts of Barley. Both of these are loose smuts, very similar to the loose smut of oats. One of them, *Ustilago hordei*, usually retains the spores covered by a thin membrane until harvest, the other, *Utilago unda*, is usually blown away, like the oat smut, long before harvest. These smuts are both killed by treating the grain in the same way as for the loose smut of wheat, except that the water must not be quite so hot, only 130° instead of 132°.

The Smut of Corn (*Ustilago maydis*). For twelve years Oscar Brefeld studied this smut, both in the field and in the laboratory. It had been taken for granted that its manner of growth was the same as that already described. In February, 1888, he gave the results of his investigations to the world. Then we learned that the spores of this smut germinate in fresh manure, and in manure water. There they threw up into the air short branches or stalks which yield great quantities of secondary spores; these carried by the

winds to corn fields are deposited upon the growing corn plants, washed by dews and rains inside the leaf, sheaths and husks of the ears; there they send out their germ tubes, penetrate into the plant tissues, and finally transmute the grain into a mass of primary spores which we call corn smut. This makes it evident that it is useless to expect to prevent smut in corn by any treatment of the seed before planting, nor has any method of preventing corn smut economically practical been discovered. However, there is reason to believe that if fresh manure from stock fed with smutty corn, cornstocks, or corn silage is spread on land to be directly planted with corn, there will be an increased quantity of smut in the corn.

Is corn smut injurious to cattle? Bulletin No. 137 of the Michigan Agricultural College Experimental Station, issued October, 1896, gives an interesting account of an experiment instituted to test the matter. Four dairy cows were selected to be fed with the smut, beginning on the 6th of November, 1895. One cow had calved early in August, two were six months gone, and the other expected to calve the 5th of December. One of those six months gone, and the one due to calve early in December were fed two ounces of smut each, daily, for two days, then increased daily until by the 19th November each was fed two pounds daily. This amount was continued to December 13th, when they were each fed three pounds, and the quantity increased one pound each day thereafter to and including December 17th. On the 18th December each cow was fed ten pounds, and on the 19th December, 1895, eleven pounds. On this day five pounds were fed in the morning and six at night. The next morning it was found that the night ration, which consisted of corn 4-10, wheat bran 3-10, ground oats 2-10, oil meal 1-10, mixed with six pounds of smut, had not been entirely eaten, about $\frac{3}{4}$ of a pound of the mixed ration being left in each manger. For the first time their appetite for smut seemed to have been fully satisfied. This closed the feeding with smut experiment. These cows were watched for a week thereafter. They continued in good health. The other cow six months in calf, and the one that had calved in August, were fed two ounces daily for two days, which was gradually increased to one pound each by the 17th, which amount was continued daily up to and including the 19th of December, at which date the experiment was closed. These cows ate it with avidity to the last. The cow due to calve December 5th dropped her calf at the expected time. The other pregnant cows were watched for signs of abortion, but none appeared. The milk yield of those giving milk was regular and constant.

A quantity of the smut was analyzed by the station chemist who reported as follows:

Moisture	8.30	Cellulose	24.69
Albuminoids	13.06	Sugar	4.00
Carbohydrates	25.60	Fat	1.35
Ash and much sand	22.50		

The ash was rich in phosphates of potash and magnesium, like the ash of grain. The smut was carefully examined for poisonous alkaloids, but not a trace could be detected.

Just a parting word of advice. After having killed the smut spores of wheat, oats and barley by any of the methods described, your labor may be all lost and your seed grain again contaminated with living smut spores, if you neglect to disinfect all sacks, vessels, and implements used to hold or to plant the grain. This can be done by preparing a solution of copper sulphate of the strength of one pound in ten gallons of water, and soaking all sacks, tools and implements in the solution, and with it wetting or washing the floor or canvas on which the grain is to be dried.

UNDERDRAINING.

By N. Monteith, Stratford.

The three great essentials to successful modern agriculture are underdraining, cultivation, and manuring. Underdraining is of special importance throughout the larger portion of Western Ontario owing to its slight diversity of surface and great depth of

clay soil which has a tendency to retain moisture in excess of crop requirements if not removed by underdraining. Soil is that portion of the earth's surface upon which plants grow; it is usually the upper stratum of decayed and disintegrated rock mixed with humus or decayed vegetable matter and animal remains; it varies in depth from a few inches to several feet. Sub-soil is that portion of the ground that lies beneath the soil and upon underlying rock. It is generally more compact than the soil and of a different color; it also contains a greater proportion of inorganic matter. Soil may be described as decayed sub-soil, and sub-soil as decaying rock. The fertility of soil depends largely upon the rocks from which it is formed. Soil formed exclusively from one kind of rock is frequently unproductive. The most fertile soils are those derived from a variety of rocks. When soil rests upon strata from which it differs widely in composition, it is called a soil of transport. Our Western Ontario farms are largely made up of disintegrated rock transported from the great rock formations which lie to the north and east. Geologists tell us that in the distant past this highly favored Western Ontario was covered by immense ice glaciers estimated to have been over 1,000 feet thick. These moved in a south-western direction over the rocky floor, grinding off rock ledges and carrying them far southward, as far south as the State of Ohio. Then from some cause unknown to us, through changed conditions of climate, this immense mass of ice began to melt, causing tremendous floods. These torrents sweeping southward deposited beds of sand and gravel much as we find them to-day. The depression occupied by the great lakes and Western Ontario became a shallow sea. No doubt during this period the silt formed from the washings of rock settling to the bottom of this sea formed the basis of our soil. There is reasonable proof that during this period the water flowed southward to the ocean through the Mississippi valley. After a lapse of time, it is supposed, through some convulsion of nature such as earthquake, volcanic eruption, or subsidence, an immense crevice was opened through the great rock masses to the east of us giving birth to the mighty St. Lawrence, thus allowing the draining of the great lakes at a lower level, bringing Western Ontario into existence as an immense mud flat which soon took on its present physical features, water courses formed and vegetation clothed the naked earth. The chief of the forces in the conversion of rock into soil are, atmosphere, changes of temperature, water, the growth of plants, and earth worms. The atmosphere disintegrates rock through oxidation, rendering some of the elements soluble. Changes of temperature disintegrates by causing alternate contraction and expansion as in freezing. Water disintegrates rock both by chemical and mechanical action—chemical by the solvent power of carbonic acid absorbed from the atmosphere; mechanical, the wearing and carrying power of water in motion. Plants promote the conversion of rocks into soil, both in their growth and decay—in their growth by the dissolving power of their roots; in their decay by the carbonic acid which is thus formed acting upon limestone. Earth worms in their burrowings bring fresh particles of earth to the surface and form apertures for the passage of air and water to the sub-soil.

Soil is composed of particles separated by small spaces or cavities. In these particles are cells or pores capable of holding and retaining water. A drained soil is that which has water in the pores of the particles and air in the spaces around them. It is estimated that 100 pounds of sandy soil will hold twenty-five pounds of water that drainage will not carry off; a sandy loam, forty pounds; clay loam, fifty-five pounds, and a clay soil, seventy five pounds. It has been found that as much water as may amount to eighty per cent. or more of what the soil can hold is hurtful to ordinary agricultural plants, and that a soil charged with water to the extent of fifty or sixty per cent. of its capacity offers the best possible condition for the growth of crops when other circumstances are favorable. In general, it may be said that the larger the proportion of clay or humus in a soil, so much the more power will that soil have of holding water, while the water holding power will be so much the smaller in proportion as sand is more abundant in the soil. The removal of stagnant ground water in itself is of great advantage to growing crops. Its presence gives rise to ferrous and sulphuretted compounds that are poisonous to agricultural plants.

Drainage is always a costly operation, and it is therefore peculiarly needful to have it executed in such a way that it shall be effectual and permanent. In some cases nature

has already provided complete underdrainage through underlying gravel beds, but this is the exception rather than the rule. The depth of drains and their distance apart must be largely determined by the outlet and nature of the soil. In stiff clay soil the drains should not be over two and one-half feet deep, and put in at close intervals not to exceed four rods apart. On loamy and less retentive soils drains three and one-half to four feet deep give satisfactory results when further apart. Care should be taken to have a uniform bottom for the tile. Where there is sufficient fall, running water is a safe guide, but where the land is level or nearly so, the spirit level carefully used will give more satisfactory results if other details are properly attended to.

Round tile are the most satisfactory to lay, as they are generally straighter than the other designs. Do not use defective tile ; it is false economy. Start laying the tile from the outlet, and be sure that every tile lies close and solid. In beds of quicksand, sods or sawdust should be put in to lay the tile upon. The surface soil should be used next the tile in covering, and should be tramped before finishing with the plow. Main drains should be deeper than the laterals. Extra care should be taken to have drains vermin proof at the junctions. The most satisfactory method is to have the lateral drain empty into the main drain through a hole cut in the centre of the lateral and laid exactly above a corresponding hole in the top of the main. When a drain must of necessity pass near to trees, we have found it practicable to exclude their roots from it by dipping the ends of the tile in coal tar and laying them closely ; coal tar thus used will also exclude quicksand. Every farmer should keep a map of his farm with the location of each drain marked and distance noted from some permanent object. This will be found convenient if laterals are required or extensions needed.

Drainage lengthens the growing season by allowing earlier seeding and later cultivation. It prevents winter killing ; it permits the warm rains and air of spring to enter the soil, warming it and retaining the nitrogen in the form of ammonia brought down by the rains; prevents surface washing ; deepens root range ; renders cultivation easier. It may seem inconsistent to say that land well drained is drier in wet weather and more moist in dry weather than underdrained land, yet experience proves this to be the fact. Ridges and surface furrows which tend to wreck farm machinery are no longer needed ; the land can be kept flat. It has been officially determined in Germany that the snow melts in that country a week earlier on the average upon drained land than on undrained land similarly situated. It was also noted, moreover, that the vegetation was peculiarly rapid upon drained land. We are all striving to obtain earlier harvests, greater variety of crops of better quality, and more abundant yield, more healthful surroundings for both man and beast, all of which in a measure results from judicious underdraining.

"There are farms beneath our farms which we can realize on if we but observe the proper principles of underdraining."

UNDERDRAINING.

By D. E. Smith, Brampton.

A few years ago underdraining was tried in many parts of Ontario as an experiment ; now it has gone beyond that stage and it is found to be necessary and profitable in most localities. By experimentation and by experience we have learned many profitable lessons, and in this age of keen competition it is necessary to take advantage of everything that will assist in farm operations. I claim that underdraining is profitable, and that there are many advantages gained by a proper system of underdraining. To begin with, it may not be out of place to point out some of its advantages.

It enriches the soil. As the rain descends it absorbs certain elements found in the atmosphere, such as carbon di-oxide, ammonia and nitric acid, and these go into the land with the rain and are retained by the soil as the rain passes to the drains underneath. These are found to be useful and available for plant food, and so the soil is enriched. Manure is also made more available. The soil having become pulverized

the liquid from manure is distributed evenly through the land, and the plants are thus enabled to obtain it, whereas if the land were compact and solid the liquid would be carried off and with it the manurial elements. Thus a loss would be sustained.

It raises the temperature Underdrains keep the water from standing on the surface or being retained in bulk in the soil. In the spring of the year the land can on that account be worked some days earlier. The soil thus becomes more porous so that the heat and rain can penetrate into the soil and so it soon becomes warmer. In compact land the rain runs off and the heat of the sun cannot have much effect on the soil. It has been found by experiment that land well underdrained is from six to seven degrees warmer at the depth of from five to seven inches than land similar in other respects that is not underdrained. This is a great advantage as our seasons at the best are short. Besides this it is generally conceded that an early sown crop produces a much larger yield and of better quality.

It makes the land more open and porous. The water near the underdrain runs into the drain leaving a space that is filled with air; the water near this runs into this space and is carried to the drain, and so on it extends wider and wider each year. Whenever the water runs away, air of necessity takes its place, and this air circulating through the soil makes it open and porous. Thus the land becomes pulverized and soon it is found to work much more easily.

It prevents surface washing. As the rain descends it enters into this open and porous soil and is carried through the soil to the underdrain enriching and warming the land; but if not underdrained and compact there would be washing in many places. The plant food contained in the rain, and the plant food in the manure spread over the surface of the soil, or any manurial elements in the surface soil would be washed away instead of being carried into the soil and retained there. The porous soil acts as a filter, and holds in suspension the plant food brought from the surface. This is thus available for the plants.

It adds moisture in dry weather. In open and porous land the moisture is enabled to rise to the surface by means of capillary attraction. This moisture is increased if the surface soil is frequently stirred. If this same kind of soil were kept compact and solid the moisture could not rise to the same extent. Experience and experiments go to show that the moisture is increased by frequent cultivation in well underdrained land.

It lessens the heaving of clover, etc. When water is retained in the soil and it freezes, it forces the clover plants up, but if this water were removed by underdraining then it could not have any such injurious effect. This will apply to other crops as well. There is also some advantage to such crops as clover that it deepens the soil and they are enabled to obtain more nutriment.

Taking it for granted that you are going to underdrain your land, I will go with you and first we will look for an outlet. This is a very important step to begin with. The outlet should contain if possible a good fall. Next we stake out the field if we are going to underdrain it at certain distances apart or even if we intend running only one drain through it. A plow with the mould board taken off can often be used with advantage. Then we want suitable spades, and our plan has been to begin at the outlet and work up. Before leaving the outlet, I would like to say that it should be protected by mason work and care should be taken to prevent any vermin going up the tile. The bottom of the trench should be narrow so that the tile will lie firm in it, and they must be fitted very close and tight together; any displacement will lead to trouble afterwards. There should not be too much of a curve in the course of the underdrains, and all curves should be very gradual. The tile cannot be too carefully laid around any curves. If laterals come in from both sides they should be alternate and be above the main drain. The angle at which they enter should be as small as can be arranged; the smaller the better, for then the water enters the main drain and goes along with the water in it more easily. It is less liable to accumulate silt.

Different conditions and kinds of soil require different treatment so that no set rule will apply to all, but there are general principles that may be applicable in most

places. To drain evenly over the whole field, it is best to have the tile laid three feet deep and from fourteen to eighteen feet apart, if the soil is a clay. However, if the clay is very hard it will in some places be found that two or two and a half feet may give better results. On lighter soil the tile may be placed from three to three and one half feet deep, and from twenty-one to twenty-four feet apart. In loamy soils they may be from three to four feet deep, and from thirty to forty feet apart.

In the discussion the following points were brought out: The fall should be at least three inches in one hundred feet, but more if it can be arranged. In quicksand place something firm under the tile, as plank or sods, and cover with gravel for six or eight inches. Drain in early spring or late fall, as there are advantages in favor of these times. If tile can be bought at all reasonably they are the cheapest and best in the long run.

WHY WE SHOULD UNDERDRAIN.

By James McEwing, Drayton.

In discussing the subject of underdraining which is a question of vital importance to the farmers, I think it well to treat the subject from the standpoint of a practical farmer, who may be desirous of improving his farm and securing more profitable returns to recoup him for the expenditure incurred. In considering the question of underdraining there are three main problems which should be kept prominently before us: (1) The quality of soil requiring underdraining. (2) The cost of underdraining, and (3) The results to be obtained by underdraining. It may be conceded that all agricultural lands will give better returns if drained. That sandy and gravelly soils and clay and clay loam with gravelly subsoil will in most cases be fairly well drained by reason of the open and poreous nature of the subsoil. That all clay and clay loam soils overlying a clay formation require more or less artificial underdraining. This being granted, perhaps it will be most profitable to discuss underdraining in its relation to clay and clay loam soils overlying a clay subsoil. One of the peculiar features of clay land is its power of retaining water at or near the surface until the hot season arrives. This stagnant water is injurious to a great many plants. When the decayed timber and vegetable mould of the virgin soil has been taken up and absorbed by the growing crops, one of the great difficulties to be contended with in the cultivation of clay land is the tendency of the soil to run together, and become hard and comparatively sterile. Soil of this kind is nearly always saturated with water at seeding time. During autumn rains, spring freshets and heavy summer showers, clay soils become saturated with water, and if undrained does not dry out readily and the effect of any sudden excess of heat is that it becomes sour. In this condition no crop will give satisfactory returns. If the land has been cultivated and cropped for a number of years under the ordinary system, or rather want of system, a great deal of it becomes what is termed runout and it is then necessary to make a radical change in the manner and method of cultivation. The first essential towards securing success in renovating and improving the land when it arrives at that stage is to remove the surface water by underdraining. The cost of underdraining will depend largely upon the extent to which the work is carried. With the exception of localities situated near large towns or cities, it is doubtful if the land is of sufficient value as yet to justify as large an expenditure as would be necessary in following out as thorough a system of underdraining as is recommended by some, and which is no doubt found to be profitable in old and thickly populated countries where land has become very valuable. If the ponds and wet places where the water remains in the soil, after the other parts of the fields have become dry in the spring were drained, the land would be improved very much, and that without expending a large sum per acre. A considerable portion of the more rolling lands would be fairly well drained by putting in twenty rods of drain per acre if judiciously placed, but the greater portion would require forty rods per acre and the more level lands would require sixty rods per acre to bring the land into satisfactory condition. This of course means a large expenditure of money; but it is doubtful if there is another way in which a farmer can make an invest-

ment along the line of improving his farm which will give as sure, quick and large returns as by thoroughly underdraining his land. In buying tile be sure and get good, thoroughly well-burnt stock. Soft, half baked tile is worse than useless. Use tile of sufficient size to carry off the water readily. This necessitates only a small increase on the first cost of the trench and tile, and it is a great advantage to get the water off quickly. Two inch tile will be large enough for laterals twelve or fifteen rods in length, if there is a fairly good incline; but if the land is comparatively level use nothing less than two and one-half inch tile, and if over forty rods in length it is better to use three inch tile. Main drains will require a larger tile, the size of which must be gauged by the extent of the laterals connecting therewith. Three inch tile will be about the average size required in the ordinary farm and will cost about ten dollars per thousand, making the cost of underdraining as follows, although it will vary somewhat in different localities:

Cost per rod.

15 tiles @ $10 per thousand	15 cents.
Digging trenches, placing tile in drain	17 "
Covering tile	01 "
	33 "

20 rods per acre would cost	$ 6 60
40 " " "	13 20
60 " " "	19 80

In places where there is a rapid descent or much surface water during freshets, it is well to locate the drain a little to one side of the lowest ground. This will minimize the risk of the drain washing out, which often occurs in situations such as this when the drains are carried down the lowest ground. Main drains should be three feet deep and lateral drains not less than two feet six inches deep. Lateral drains should connect with and discharge the water into the main drain from above instead of on the same level. This method will give greater pressure and velocity to the water in the main drain, and almost entirely do away with the accumulations of silt which oftentimes causes trouble when laterals connect with the main drain. Tile suitable for making such connections can be procured at nearly all the tile yards. Obtain as good and even an incline as possible for the drain, but if the land is level or nearly so a grade of one inch in two hundred feet or even in two hundred and fifty feet will work in a very satisfactory manner if the bottom is evenly graded and the tile properly laid. This brings us to a point which can not be too carefully attended to, that is, the placing of the tile in the bottom of the trench. Always see that the tile are properly placed before allowing them to be covered. The usefulness of a great number of underdrains is destroyed more by reason of the tile not being properly placed and evenly bedded in their places, than by all other causes combined. If tiles are properly laid and covered there is very little danger of them becoming displaced, or the soil washed into them, or vermin burrowing in them during the summer and destroying the good work they are doing.

In this northern latitude, under present conditions, the seasons for preparing the soil and for seeding operations is usually so short that we are unable to give the soil that thorough preparation for the seed which it ought to receive in order to obtain the best results. Land which is thoroughly underdrained is in good condition for seeding operations many days earlier in the spring than undrained land, and the soil is in good condition for the plow many days later in the autumn after the fall rains have set in. If we take into consideration the fact that during our long and severe winters the work of preparing the soil for the next crop has to be suspended for many months each year, it is certainly a matter of very great importance to the farmer to have that period extended during which the soil is in good condition for cultivation. The best means towards this end, as well as to overcome most of the difficulties in connection with the cultivation of clay land, is through underdraining. This will cause the water which falls upon the land to filter through the soil, thereby opening the pores to let in the heat and air to pulverize and

make mellow the soil which would otherwise become sour and hard through the action of the water upon it, while it is undergoing the process of evaporation. If land is underdrained the soil becomes more friable or, in other words, the mechanical condition is greatly improved by the action of the light, heat, air and water which is allowed to a much greater extent to penetrate the soil, making available to the growing plants the plant food contained in the soil, thereby ensuring more abundant crops. No matter how rich the soil may be in those constituents required by the growing plants, the plants may literally starve if those constituents are not subjected to the action of light, heat, air and water to induce that chemical change which is required to render them available as plant food. How to maintain the fertility of the soil is one of the most important questions to which the farmer can direct his attention, and this is a subject with which the ordinary farmer must of a necessity grapple with in the near future. At present in many instances we are permitting the most valuable constituents of the soil to be gradually and surely lost by being washed away by the surface water in its efforts to reach the streams. If the land was underdrained, most of those valuable constituents, now wasted to such a great extent, would be preserved and retained in the soil for the use of the growing plants, being deposited in the soil by the water as it filtered through to the underdrain. Owing to the improved condition of the land as a result of underdraining, the soil becoming more mellow and friable, permitting a much better circulation of air and moisture, the growing crops are enabled to withstand drouths to a much greater extent. Underdraining ensures not only an earlier seeding and more bountiful crop, but in many instances on low lands in wet seasons it makes all the difference between a good crop and a total failure. It would be well within the mark to say that a generous expenditure in underdraining clay soils will so improve its condition that the investment is likely to be repaid in full by the increase in the yield of crop in a period of three years, and is certainly sufficiently profitable to offer strong inducements to the farmer to enter upon the good good work. The benefits briefly stated are:

Underdraining will make the soil easier to cultivate. It will deepen the soil suitable to sustain plant life. It will give an earlier seeding. It will give a longer growing season. It will prevent surface washing and loss of plant food. It will to a great extent prevent the heaving out of wheat and clover by frost. It will lessen the labor in preparing the soil. It will increase the yield. Is will improve the health. It will increase the wealth. All of which is certalnly very much to be desired and sought after by those who are following the business of agriculture.

SOME OF OUR NEWER WEEDS.

By T. C. Wheatly, Blackwell.

There can be no question but that the presence of weeds is a great yearly source of loss both to the individual farmer and to the Province at large. It has been estimated, and I think the estimate is well within bounds, that Ontario's loss from this cause is not less than ten million dollars annually. Now this loss is largely preventable. There is too great a disposition to look upon weeds as a necessary evil, and too little of a disposition to grapple strenuously with the question of attempting to get rid of them. There are numerous examples of clean farms in the country, but is there not too much of a disposition to let the weeds have their own way, and then blame Providence for the poor crops we reap in consequence? It would not be so necessary to speak upon a subject like this in a Farmer's Institute meeting were we not all convinced that the weed nuisance is on the increase, and especially that new weeds, many of them worse ones than those we have heretofore to contend with, are being from time to time introduced. There is need of an awakening of public opinion and public action upon this question. True, we have upon our Statute book a law against the spread of "noxious weeds," but it is almost

a dead letter, and indeed the law is behind the times in one respect, for weeds there enumerated are not now our worst ones. Others have come in since that Act was passed which outstrip those in power for mischief. In the States west of the Mississippi there are laws against the introduction of the Canadian thistle, and I am told that these laws are so well enforced that scarcely a specimen of that weed can be seen. What loss it would have saved us if that had been the case here.

The history of agricultural from its commencement in this country has been one of the continual introduction of weeds. Very few plants among the host now enumerated as weeds were natives of this Province. Even the Canada thistle, though it possesses that name, is an European weed, introduced probably by the soldiery during the wars of the last century, and getting a toothold about Lake Champlain spread into Lower Canada and thence into the New England States, where the Yankees gave it the name of the "Canada Thistle." The fire-weed, golden-rod, smart weed, beggar's ticks, sheep sorrel, milk weed, maple-leaved goosefoot, with a few others, perhaps a dozen or twenty, all now considered perfectly harmless, were the only ones our first settlers had to contend with. Even such familar weeds as the lamb's quarter and dandelion are introduced weeds. But with advancing settlement, and especially since the introduction of railways, scores of fresh ones, and among them some of our very worst ones, are being steadily introduced. As instances of unsuspected ways in which weeds are sometimes introduced, I might say that Darwin, the noted naturalist, found in six grains of earth adhering to the feet of a plover, three kinds of seeds, and in mud sticking to the feet of ducks and geese shot in England, seeds peculiar to the Victoria Nyanza in Central Africa. In mud sticking to the feet of a Texas steer the seeds of five different kinds of weeds and grasses common in Texas, were found by a microscopist after the arrival of the animal in New York. In my own experience, in a mixture of imported grass seeds, bought of a first-class seedsman, I found four kinds of weeds I had never seen before, though I thought I had studied nearly all our common weeds.

Before proceeding to describe a number of the newer weeds in my collection, I would like to impress upon you the importance of knowing the names of our weeds, as it is a great help in recognizing them when they first make their appearance. It is then that the most satisfactory work can be done in preventing their spread. Know them, and then you can nip them in the bud so to speak. "A stitch in time saves nine" truly in dealing with weeds. If the prelate in the east who introduced the blue-weed into his garden from Europe, had known it to be a bad weed he would have saved himself the discredit of having it named "the bishop's curse," the name by which that weed is known in a certain locality. I realize that to know the weeds implies some acquaintance with the science of botany, a knowledge at present not possessed by many. But botany is one of the subjects now required to be taught in our public schools, and I would like if I could get the ear of our school trustees generally so as to persuade them to give every encouragement to our teachers to begin the practical study of this subject. This could easily be done by encouraging pupils to bring specimens of their weeds to school and have them identified, pressed and mounted. Thus the subject could be taught with very little effort, and that of a very pleasurable and taste-inspiring kind. This is one of the many instances in which a farmer needs to know his business thoroughly, as any business or professional man needs to know his, in order to be successful in it. A leading educational authority in this Province said lately in one of our papers, that he did not believe one farmer in a dozen could give the generally accepted common names of twenty of our common weeds. I am afraid this is too true, and if so calls for a remedy.

I will now give a brief description (reference being made at the same time to the mounted specimens) of some thirty of our newer and worst weeds, accompanied by comparison with commoner forms said to aid in identification, viz.:

Russian Thistle.—A great scourge in the Dakotas, but not likely to be so much so here. Has been noticed at a few points.

Great rag-weed.—Specimens collected at Port Huron, Michigan. A larger weed than our common rag weed.

Creeping or Perennial Sow-thistle.—Very generally introduced in the Counties of Ontario and Durham. One of the most aggressive and difficult to eradicate. Strenuous efforts should be made to destroy it and prevent its spread.

Prickly Wild Lettuce.—Destined I believe to be our very worst field annual, as the purslane is our worst garden annual. Spreading fast in Lambton County and I am told about Campbellford.

Wild Tare often called wild pea.—The cultivated tare, escaped as a weed in some field, is also called by the same names. It is not liable to spread except in seed or manure, but one of the most difficult to eradicate.

Ox-eye Daisy has got a firm hold in many places. Its habit of stooling from the crown enables it to run out most grasses. It should be resolutely dealt with.

English Plantain and Tall Buttercup.—Also two troublesome weeds in grass lands, and apt to find their way into clover fields.

Bladder Campion.—Not creeping rooted, indeed, but just as hard to kill as that class.

White Cockle and Night Blooming Catchfly resemble each other, and are apt to come in clover seed. They should never be allowed to go to seed.

Indian Chickweed is spreading in Essex. It may become almost as troublesome as purslane in the garden.

Field Speedwell also purslane speedwell and Allyssum calcycinum. I have found these three weeds very troublesome in strawberry ground. They are all annuals, making rapid growth in early spring and seeding by the first of June.

Tansy Mustard.—I am not sure but this is the tumbling mustard of the Northwest Territories ; a bad one, like all the mustards.

False or Wild Flax belongs to the mustard family, and like red root, pigeon weed, and other winter annuals, is bad in fall wheat.

Black Bindweed, (field convolvulus).—Perhaps the very hardest of our creeping rooted perennials to kill.

Field Pennycress.—Stinkweed, or Frenchweed of Manitoba ; a very bad pest in Manitoba and is becoming so here in many places. It is a winter annual, and grows and seeds throughout the summer.

Spring Clot-bur or Cockle-bur.—The worst of the sheep burs.

Spurry.—A bad weed though recommended by some for green manuring on sandy soils.

Biennial artemisia.—Bitter like ragweed. Have seen it a bad pest in root crops on moist soils.

Field Poppy.—A troublesome weed in England.

Wild Barley.—(Squirrel tail grass). Considered one of their worst pests in hay fields in the Northwest, and may come to us in timothy seed brought from there.

Wild Oat.—Great care should be taken not to buy seed oats from farms infested with this weed, as when once introduced on a place it generally "comes to stay."

Crab Grass.—A most noxious importation from the South.

Bur Grass.—A miserable pest.

Nut Grass.—A sedge. Propagates by little tubes. It is scarcely possible to ever get rid of it if once introduced.

Potentilla recta.—A new cinquefoil coming in on the Niagara frontier.

Bladder ketmia.—Collected the past summer in a field being over-run with it. New in Ontario.

To these I may add some roadside weeds: blueweed, atriplex, wild chicory, velvet leaf, teasel, elecampane and even sweet clover. It is necessary to exercise unceasing watchfulness to prevent these and other weeds from making our roadsides an unsightly tangle.

WEEDS.

By Geo. Binnie, Bunessan.

Travelling through the country we can see field after field colored with the purple thistle top, or brilliant with the yellow mustard, while upon closer observation others less prominent are found to be equally abundant. In this part of the country weeds are becoming more abundant. This is owing partly to the failure to get a catch of grass during the last two or three dry seasons, and having to re-plow and re-crop too often and thus allow the weeds to multiply. During the past year so much feed has been imported into this district that many new weeds have been brought in, and are making their appearance here and there. Every plant out of place may be called a weed; a grain of wheat is a weed in a flower garden, and a rose in a wheat field is also a weed. But there are some plants that may be considered weeds under all circumstances, such as the thistle, mustard, wild oat, ox-eye daisy, etc., and every farmer should bend his energies to eradicate all such from his farm.

Weeds are distributed in many ways. The seeds of some, such as the thistle, are provided with feathery attachments and are borne far and wide on the wings of the wind. Others, as the burdock, attach themselves to passing animals, and are carried by them to other parts where they flourish and grow. Weeds are too often carried from one part to another in seed grains and seeds. Three years ago I got a pretty good dose of daisy in grass seed which gave me a great amount of trouble, and I am not done with it yet. Threshing machines, too, carry seeds from one place to another, and are a very common means of distributing weeds.

Weeds are injurious in many different ways. First, they take up room that should be occupied by useful plants, and being usually of a more sturdy nature than the cultivated varieties, crowd them out and deprive them of moisture, air and sunshine. Second, they take from the soil the food that should go to build up the useful plants, thus making the latter weaker and less liable to withstand the crowding of weeds, and the attacks of insects or disease. Third, there is another way in which weeds are an injury to the growing crop. All plants draw a certain amount of water from the soil, and through the leaves throw it off into the atmosphere. Prof. Panton, of the Ontario Agricultural College at Guelph, and others have lately been making some experiments as to the amount of water conveyed by certain plants from the soil into the air, and have arrived at some startling conclusions. Taking the wild mustard plant and allowing ten plants to the square yard, it was found that from an acre this plant would take upon the ground and evaporate into the atmosphere over twenty tons, or more than four thousand gallons daily. Other plants of a like nature also throw off large amounts of water. This is a very serious matter especially in this dry climate, as much water is being wasted by these these useless plants as would ensure a successful crop of the different grains. This of itself ought to be sufficient to make any farmer strain every effort to rid his farm of useless and injurious weeds. Fourth, it costs a large amount to handle them; it costs many thousands of dollars for the time it takes to bind them: it costs large sums for drawing, for storage room and threshing; it takes extra labor cleaning the grain for market or seed; indeed it is almost impossible to get it clean, and there is considerable loss in the reduction of the market value of grain not properly cleaned. The yearly cost of growing weeds to the farmers of this Province amounts to a large sum, and costs more now in proportion to the value of grain grown than at any previous time. There are different classes of weeds requiring different treatment for their eradication. Those known as annuals grow only from seed. They grow, mature and ripen their seed in one season. Some of the most common are wild oats, mustard, cockle, fox-tail etc. The seed of these

are of such a nature that they will lie a long time in the soil and grow when favorable circumstances arise. The best method of attacking them is to turn the seed to the surface, get them to grow, and kill them before they are allowed to seed. The biennials take two years to mature and ripen seed. The perennials are perhaps the worst class of weeds. They grow from the roots as well as the seed. Some of these are the Canada thistle, ox-eye daisy, couch grass, etc., and owing to the tenacity with which they cling to the soil they are extremely difficult to get rid of.

The remedy to be applied to rid the soil of these and all other weeds is good cultivation, and the first requisite is to remove all obstructions as stones, stone piles, and rubbish of every description, as these are not only a hindrance to cultivation but also a protection to weeds of all kinds. Then the land should be well plowed, every inch of it turned over and not done in that careless slip-shod manner that we see so often in our fields. No amount of after cultivation will make up for poor plowing. If the land is very dirty it will be necessary to summer fallow, and it will pay to do it thoroughly and kill, if possible, every sign of vegetation in the field. But land, unless extremely dirty, can be cleaned and kept clean without summer fallowing and without the loss of a season. Hoed crops should be extensively grown, as potatoes, turnips, mangels and corn. Large quantities of these are necessary to feed the stock that ought to be fed on every farm. Proper cultivation will be a valuable assistance in the destruction of weeds. A short system of rotation of crops should be adopted, as a long continued cropping of grain is a sure method of encouraging and multiplying weeds as well as impoverishing the soil. We should grow plenty of clover. It crowds out weeds and enriches the soil. The best method to clear a farm of weeds and keep it clear is to practice a thorough cultivation of the soil, adopt a short rotation of crops and grow plenty of clover.

MIXED FARMING.

By A. W. Peart, B.A., Burlington.

By mixed farming is meant that system of farming engaged in by the majority of farmers in the Province of Ontario; those who devote their energies to the production of grain, beef, pork, butter, fruit, etc., or, perhaps, to only two or three of these lines. Some of our farmers are specialists, that is to say, they make a specialty of some one branch, as the breeding of a certain class of stock, or dairying, or grain growing, or the growing of fruit. As between mixed farming and specializing it seems to me that the situation is something like this: if a farmer has a natural aptitude or skill in some special line, if the natural conditions of his farm are favorable, if he has reasonably easy access to good markets that are likely to be permanent in their character, and if he has sufficient capital, it appears to me that, if he were to engage in a specialty, he would be more successful than if he went into mixed farming. On the other hand, however, I am of the opinion that in the long run mixed farming is the safest system for the average farmer to pursue. He then has several strings to his bow, and should one fail, he has something else to fall back upon, which may help to tide him over the year. Last season, for instance, was a very discouraging one for the fruit grower, while wheat, pork, milk and cheese gave remunerative prices. In previous years wheat did not pay, and so it goes, the different farm products varying in price with each successive year in accordance with economic laws. In mixed farming, however, I think it is well for a farmer to make somewhat of a specialty that line which appears to be the most profitable; in short, to try to adjust his business, as well as he can, to the ever-changing conditions of the time, and thus take advantage of the tide. While it is true that farming is in a depressed condition, it seems to me that there are indications of a change for the better. Prices of late have, in several lines, stiffened considerably, and in a general way, every depression has a corresponding reaction. We should not lose heart, but economize our forces to the utmost. Which way shall I turn in order to better my condition? is a serious problem to most farmers.

To my mind there are a great many important things to consider in striving to solve this question. Each farmer is, in a measure, a law unto himself; still there are general principles which underlie and control all. Every farmer has his own peculiar conditions and environments, which he should consider and weigh well in laying out his plans for the future. The nature and capabilities of the soil of his farm, the general features of the farm itself,—is it hilly, broken, rolling, level, abundantly or poorly watered—the climate, situation, market facilities, etc.—everything counts. We should study the markets, what the outlook is for such and such a line, and direct our energies towards the production of this or that group of farm products which on the whole appears to be the most profitable for each one of us individually. In times gone by, barley, in some sections of the Province, was a very profitable crop to grow for sale. That period, however, has passed, and does not appear likely to recur again for some time at least, although barley is still a valuable grain to raise for feeding purposes. Grass seeds, too, generally catch well with it. Could we but get good crops, wheat at 75 cents per bushel would be profitable. It appears to me, however, that the present good price is due to an exceptional set of circumstances that are abnormal and of a temporary nature, such as the comparative failure of the crop in the Argentine Republic, India and Australia during the last season; and that we with our older farms in Ontario will scarcely be able in the future to compete in the world's markets against the cheap labor, virgin soils and low transportation rates of many of the wheat producing areas of the globe.

Between electricity, the bicycle and the general depression in values, the horse trade of late has been under a cloud. However, it seems to me that in the near future the price of horses is bound to go up. Relatively few colts are being raised, the export of certain classes are still going on, and likely to do so, the present generation will sooner or later be wiped out and how will they be replaced? I believe that beef can still be produced at a profit. Cost of production has substantially decreased, and first-class beef still commands a fair price in the British market in spite of the embargo. Should the idea of shipping chilled dressed beef in cold storage be realized, it would also be an advantage to us in the enlargement of our trade. The relaxation also of the quarantine regulations between Canada and the United States is thinning out the supply of cattle in this country and thus stiffening prices. Dairying is profitable and likely to continue so, as the demand for first-class butter and cheese in Great Britain is practically without limit. We have secured the lion's share of that market for our cheese, and now the British consumer is beginning to realize the merit of our butter as well, our exports there the last two years showing a most substantial advance. It seems to me, however, that too many of our farmers still handle their butter at a loss, and that the only practical solution of the question for them lies in an extension of the co-operative system, and having their butter made in creameries, so as to turn out a first-class uniform product that will command the highest price. During the past winter patrons of creameries in the west were realizing from three to five cents per pound more than those farmers who sold their butter to country merchants. Here and there private dairymen have private customers from whom they secure good prices all the year, but this is not the general condition of the butter industry. In the creameries, too, the extraction of the maximum of butter fat by improved methods has an important bearing on the question of profit. Our great cheese industry rests on stable foundations, and dairymen in cheese districts make a good profit on milk by supplying it to the factories during the cheese months. Others again, convenient to large consuming centres, have built up a profitable trade in disposing of their milk to the urban population. The production of pork is probably one of the most profitable adjuncts in mixed farming. Our export trade to Great Britain in hams and bacon is growing rapidly, and this is capable of a great expansion. Our home market, too, is absorbing a large quantity of pork. Light lean hogs command the very highest price, and we should aim at producing that type of hog which the consumer demands.

In most parts of the province the growing of fruits of one class or another may be carried on at a fair profit, when the facilities for marketing are reasonably good. Last year was discouraging, prices being very low for all fruits save strawberries. But we believe that this state of affairs was exceptional, and not likely to occur again for many

years. Bushes and trees almost all over the northern part of this continent were heavily laden with fruit. This unusual crop, and the universal tightness of money, serve, I think, to account in a measure for the unprofitable prices. I am of the opinion, however, that the time has come when our farmers and fruitgrowers shall take better care of their trees, and pay more attention to the quality, the grading and packing, and the marketing of their fruit, rather than extending to any great degree the orchard acreage. In the past special attention has been given to quantity; in the future special attention should be given to quality. Systematic tests of cold storage, as applied to the more perishable fruits, will, we expect, be made this season; and should this undertaking turn out to be practicable, a new era will be introduced in the history of fruitgrowing in this country. As with beef, pork, butter and cheese, there is a wide and profitable market in Great Britain for many of our fruits, especially our apples, providing we can land them there in good condition, and try to catch the tastes of the consumer.

Should fruitgrowing be a branch, bees also should have a place in the system. Not only are they profitable for their honey, but they are useful agents to the fruit grower in the fertilization of his fruit blossoms.

Poultry is an important department in a well organized system of mixed farming. In addition to their value for egg and flesh products, hens especially are useful as scavengers, and destroy many injurious insects as well. If well cared for they will yield good returns.

Now it seems to me that each of us must be his own judge as to what combination of branches of those I have touched upon suits his own individual position. Everything is relative. In a general way, I think that butter, beef and pork are economically interwoven, and go well together. Under certain conditions, too, many farmers make sheep raising a profitable branch. In some districts also fruit growing fits in well with the above combination. Mixed farming, of course, involves the very essential department of growing various fodders, roots and grains for feeding purposes. By liberal manuring and careful cultivation this, however, may be successfully done. I believe that most of us are now convinced that it no longer pays us to sell our raw material, that is, our coarse grains, roots and fodders; but that we should use cattle, hogs, etc., as machines through which we can convert this cheap raw material into valuable finished products for human consumption. The conditions of farming have changed, and we must either recognize this and change our methods, or else go to the wall.

It seems to me that the cost of production is a vital question to each one of us, and one which receives too little attention. The profit we have on anything depends upon the difference between its cost and selling price. Our constant aim, then, should be to reduce the cost of producing any article to the lowest point consistent with its quality and quantity. The factors entering into the cost of producing any farm commodity are almost numberless. Many of these are under our control, others again are not. Corn, whether in the form of ensilage, or cured green, for winter use, is without doubt one of the cheapest and most valuable fodders that we can grow. Well cared for stock of the right sort, carefulness with implements and machinery so as to make them last, and to avoid expensive breakages; the quality of labor we employ, the amount of wages we pay every year, system in our work, business habits, economizing time, personal direction of our own work, and taking a share in it as well, modes of feeding, accidents—all these and scores of other considerations, enter into the general cost of production. Among the requisites of success, then, in farming, are: Rigid economy in producing the largest quantity of the highest quality of products, and selling it in the dearest available market; avoiding leaks so far as in us lies; and adjusting our business to suit the conditions of the times.

SPECIAL FARMING.

By Thomas J. Fair, Frankford.

By special farming I do not mean the raising of one crop only, for that is not and never can be good farming, because for the best results we must have a rotation. There may be exceptions to this where much of the farm is very stony or too hilly for cultivation on account of steepness, or where the soil washes badly, in which case the owner would be compelled to keep most of the farm in grass. By special farming I mean undertaking to do less, that we may be able to do what we undertake in a more thorough manner; I mean becoming an expert in two or three lines rather than frittering away our time at half a dozen or more—a jack at all trades and not particularly good at any; I mean raising what your soil is best fitted for; buying things for your own use if it is more profitable for you to do so. Raise what succeeds best on your own farm, sell and bear the cost of exchange. I mean recognizing the fact that father's way, though good in his time, is not the best now under the greatly changed conditions existing. It has been urged that the way the majority in any township or community does is the best way. Any man should know this is not sound reasoning, for it all depends whether the majority is right or not. Let us illustrate this. Whole communities use intoxicating drinks. It is therefore right, is it? Others advocate slavery in opposition to the practice of all enlightened people—slavery is also right, is it? Many farmers let most of the liquid manure run to waste, and through carelessness waste much of the solid part as well, and many on low, wet and heavy land neglect to underdrain. These are to be commended, are they? I am sure you will agree with me that the way the majority does is not always the best way. If all the farmers were up to the times and thoroughly businesslike in all their methods, then the opinion of many would be better than that of one.

I have no desire to lay down any fixed rules for anyone to follow, or advise any man to go into any special line of farming, but simply to set forth the claims and advantages of such farming and meet some of the objections urged against it, and set others thinking whether the way they have been doing is necessarily the best for them to follow. All improved practices must first be agitated before being adopted. Most farmers think they must raise wheat for bread, oats for the horses, corn for the pigs, buckwheat for griddle cakes, maple syrup to eat on them, all sorts of garden truck, with ducks, geese, chickens, and perhaps turkeys, to scratch them up, to say nothing of cows, colts, calves, pigs and some sheep; all kinds of fruit, large and small, together with an acre or two of potatoes and often a small orchard. Now why do we do this? Why? Because we have always done so, and many have a string of arguments in support of their practice and a longer string against any kind of special farming, as our fathers did before the days of railroads and other modern improvements. Well, yes, farmers have changed, but not as much as the conditions that surround them. Many large firms give their whole attention to the manufacture of many seemingly small articles, such as thread, buttons, lace, ribbons, glass, screws, hinges, needles, etc. Why? Because by making a specialty of these they can reduce the cost of production and increase their profits proportionately. There is more to be learned about the raising of one single crop than about the manufacture of many things that firms make a specialty of. Now, would it be singular if the man who raises one or two crops could become more expert in raising and marketing these than if he had six or more to attend to? No man's head is sufficient to know all about everything, and if he did there are many difficulties in the way of applying knowledge when too much diversified.

Many, where some kind of stock is kept, call it mixed farming. I would not look at it in that way. A man may keep cows and sell chiefly butter and cheese with a rotation of corn, clover and wheat, the first two to feed his cows and the latter to seed with and for bedding, with pigs to consume the by product of the dairy. I would not only call him a special farmer but a wise one, one doing differently from the ordinary; or he might keep sheep and raise chiefly grass with forage crops to feed his flocks; another

might breed hogs with a rotation of corn, wheat and clover and still be a special farmer. We live in a dairy section, one of the best in the country, and I do not believe we realize more than half what we might from our cows. There may be little or no profit in the first $20 or $30 from a cow, but the next $20 or $30 may be made to yield a very large profit. Now, would it not be wiser to push dairying up the other half than waste our time at something that does not pay half so well? You can find men who are doing this right along. The mere dropping of one or more crops will not in itself help you any; it merely gives a man of push, determination and perseverance a chance to excel in the particular crops he raises. Without taking account of the larger profits from this kind of farming a man ought to enjoy it more. When we have milking to do night and morning, the wheat to cut, the clover suffering from over-ripeness, the weeds contesting the ground for mastery with the corn and root crops, the bugs devouring the potatoes, it is not pleasant to be a farmer any way you can fix it. With less crops to look after there is less danger of getting in such a dilemma.

We have all heard the old argument against any kind of special farming, that a man has his eggs all in one basket, but it is well known that all the eggs and all the baskets have failed on many farms, till some clear thinking farmer, a man called a crank by some, has by special attention to one or two crops and putting all his energies and thought into their production, made a financial success of farming where under similar circumstances mixed husbandry has proved a failure. Now apply this to any county or portion of the country and see if there are not many advantages to be gained by this kind of farming. This, as said before, is one of the best dairy counties in Ontario, and while we cannot increase the price in foreign markets, except by improving the quality of our goods, we can control the cost of production, and I cannot see a better way than by making dairying a branch of special farming. If the patrons of any cheese factory or creamery would by breeding and keeping none but first class cows, feeding them on a well balanced ration and giving them more care and attention, double or treble the quantity of milk, they would lessen in many ways the cost of production. The same is true with the breeding and feeding of hogs, sheep, and cattle for beef, also in the rearing of horses, poultry, or growing any farm crop.

We all know that thirty or forty years ago the hog weighing from 300 to 500 pounds, the bullock weighing from 2,000 to 2,500 pounds, and the sheep from 200 to 350 pounds brought the highest price. How is it now? The market demands hogs of from 175 to 225 pounds, live weight, light in shoulder and full in ham, with long deep sides; beef cattle of good breeding, smoothly built, light boned, and well fattened, weighing from 1,200 to 1,400 pounds; sheep of some of the dark-faced breeds that will dress from 20 to 25 pounds per quarter, and lambs of same breeds weighing from 80 to 120 pounds. Would it be wise for Canadian farmers to make a special effort to produce what the markets require? If so, I am certain there would be better prices paid for produce where whole townships or counties were rearing the right class of stock as uniform as possible, for buyers would be attracted where the best were to be found and in the largest quantity or greatest numbers.

GRAIN FARMING VS. DAIRYING.

By Joseph E. Gould, Uxbridge.

Grain Growing. Under this head I do not class farmers who are engaged in mixed farming, nor do I include those who keep a couple of cows to make butter for their own use, but those who grow grain and cart it to the market expecting to get their chief returns therefrom. We are sowing to-day the same varieties of grains that were sown 300 years; yes, a thousand years ago. Forty years ago the farmers in this section grew from thirty to

fifty bushels of fall wheat to the acre, and sold it at from $1.25 to $1.50 per bushel. What is being done now? Take the statistics for 1895 and we find the average yield of wheat for Ontario is less than fifteen bushels per acre, which was sold for less than seventy cents per bushel. Ask yourselves if this is a march in the right direction. Let us consider this deplorable state of affairs for a moment and see if we can find the cause thereof. First, as to the yield. Forty years ago when this section was settled the land was new, nature had been storing up the fertility of the soil for centuries. Once the land was cleared it was only necessary to tickle the soil with a plow, and it responded with abundant crops of golden grain. But we have been improvident. We have sold the fertility in handfuls. No, we carted it away in wagon loads of wheat to feed the hungry; in wagon loads of barley to quench the thirst of the thirsty, and in wagon loads of rye to raise the spirits of the same; so that there is no longer the necessary plant food left in the soil to nourish the seed and carry it forward to a successful harvest. Continued cropping and selling the crop without any return to the soil have exhausted the plant, food and the inevitable result has followed. It has been stated that the farmer who follows these lines sells annually eight per cent. of his land. These are the causes of the decline in yield. Second, if you go into a modern hotel dining room at meal time you will see a man seat himself at the table, a waiter comes forward with a bill of fare, the man gives his order and the waiter brings him his food, and when he has finished he foots the bill. Now the man at the table represents England, and nearly every country in the world is more or less the waiter. Forty years ago the only countries of consequence exporting grain were Russia and the United States. Lately other countries have gone into the business, India, Argentine Republic, Uruguay, our great North West, and some other countries to a smaller extent. The man at the table demanded (the average yearly 1891 to 1895) 350,000,000 bushels of wheat in addition to all he grew. During that period we in Canada supplied only an average of 10,000,000 bushels annually. Now I ask you what chance we have to affect the price even should we, on the one hand, double our output; or, on the other hand, not ship a single bushel. The law of supply and demand regulates the price. We cannot affect the price, as our contribution to the vast amount is so small. Did you ever figure the cost of growing an acre of grain? I have, but I give you D. M. Macpherson's estimate. He is an authority on agricultural subjects. He places the cost at $10 per acre. If we take the average yield for 1895 at fifteen bushels of wheat, (and the report says less), and the price at seventy cents (and we didn't realize that), we have the sales of the acre of wheat amounting to $10.50, an apparent margin of fifty cents after paying expenses. But this is only an apparent margin, as we have sold from $4.50 to $5 worth of fertility. We see, therefore, that grain-growing is a losing speculation, and unless a radical change is made the sheriff will change the occupant of the farm, as he has already done in hundreds of cases, and hand over the land to loan companies and interest sharpers.

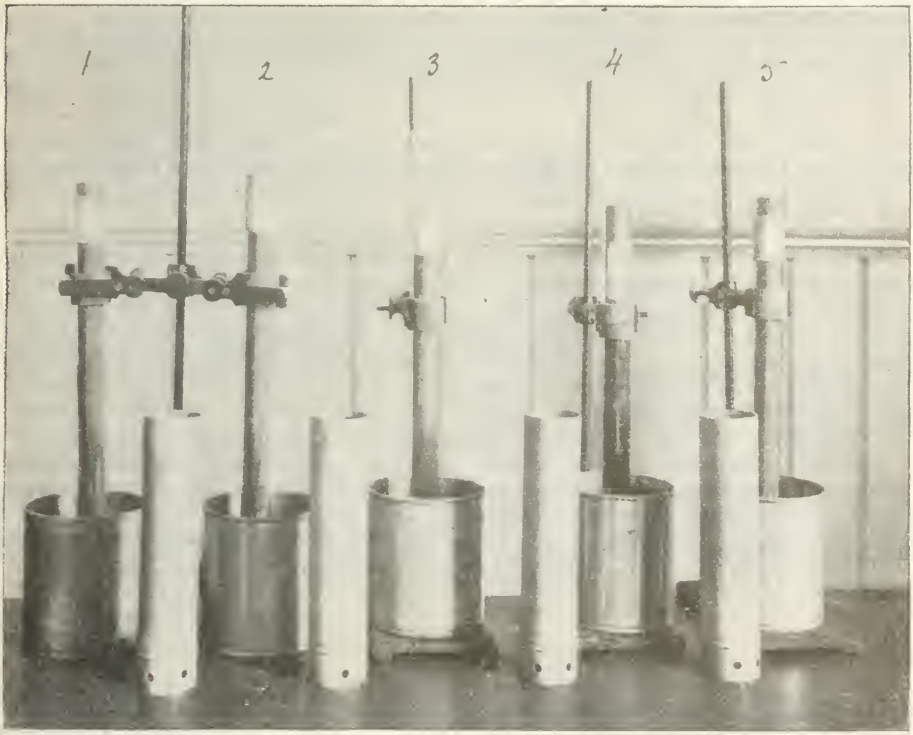
Dairying. Now, let us turn our attention to a more inviting subject, dairying, and note the progress in that branch of agriculture during the present generation. The old brindle cow has given place to the dairy animal as finely bred as a race horse. The slab covered shed and the leeward side of a snake fence has given place to the modern cow palace, with its summer temperature and thorough ventilation, ensilage, clover hay, and abundance of suitable fodder, giving the cow summer conditions the year around, has taken the place of the straw stack and the browse in the woods. The seven months milker, with five months rest and about 75 pounds of butter a year, has given place to the 10½ months milker with from 350 to 450 pounds of butter in the same time. Education along these lines has kept pace with other callings. Cheese and butter, in the creameries, are now made on scientific principles, and there is no chance of failure in making good articles, except carelessness and incompetency on the part of the maker. Paternal governments have worked wonders in the education of the dairyman, and the sure result has followed. At the Chicago Exhibition Canada took 94 per cent. of the prizes in cheese, and did nearly as well in creamery butter. Any why should we not? We have the best country in the world for dairying, a country with a good climate, a country free from contagious diseases, from violent storms and floods which cause destruction of

life and property in other climes, a hardy and intelligent class of citizens, and the best water in the world. The man at the table demands annually in addition to what he produces nearly $30,000,000 worth of cheese, and we in Canada furnish him with about 52 per cent. or about $15,000,000 of what he buys. How is this brought about? The Government has passed wise legislation prohibiting the manufacture for export of filled or skimmed milk cheese, so that none but first-class goods are allowed to be exported. The result is that when our cheese is put on the English market branded "Canadian Cheese" it sells readily because no person in England ever bought a pound of poor Canadian cheese. As to our butter trade the results have not been so satisfactory, and the reason is not hard to see. I have no doubt that there are some ladies here who make as good butter as is made in the creamery, but where there is one such the country over there are nine who do not. The fault lies largely with the merchant who pays the same price for good, indifferent and bad butter. These are all mixed together by the shipper and shipped in hot cars and hotter holds of vessels, and when it arrives in Enfiland and is put on the market as "Canadian Butter," it is a *guarantee of its quality*, for it is not fit for wagon grease. However, a brighter era is dawning. The Dominion Government have completed a system of cold storage by which means our creamery butter (and no other should be shipped) can be put on the market of England in the same condition in which it leaves the creamery. The man at the table demands $56,000,000 worth of butter in addition to his own product. Denmark supplies about 44 per cent. of that amount. Our percentage is very small. In 1895 we shipped $860,000 worth, but in 1896 we more than doubled our output ($1,890 000). This is a very small percentage of the $56,000,000 paid by England for this commodity. There is no reason why we in Canada should not make as good a showing in butter as we do in cheese. We can and do make in our creameries as good butter as is made in the world, and with a system of cold storage it only requires more cows and more creameries to effect the result. To sum the whole matter up, grain growing as I have shown you is a losing occupation and will continue to be so, whereas dairying, if conducted with skill, intelligence and industry, keeping none but paying cows, weeding out all unprofitable servants, and *feeding* judiciously, is a sure road to success. It enriches the soil and enables the farm to grow heavier crops instead of exhausting the land. Another most important thing to be considered is that the grain growing farmer has so much to contend with. He commences to cultivate the ground as soon as the past year's crop is in the barn, to get ready for the next year's crop; he works continually until the frost stops him; he is then idle for about five months, and has to spend a great part of his time sitting around the house, the village grocery, or sometimes in the bar room. When he gets on the land in the spring, he again works until the harvest is ended. He has all the vicissitudes of nature to contend with, late spring, too early a spring and followed by frost, spring too wet or too dry, summer ditto, occasionally thunderstorms and wind levelling the grain crop, and many other discouragements. And if he escapes all these and has a good crop, he has to work and wait for twelve months for his returns. And he never knows with any degree of certainty what he is likely to realize until the grain is sold and delivered. With dairying, on the other hand, affairs are different. The dairyman is not so subject to the changes of weather. He can under almost any conditions grow sufficient fodder to feed his cows. The feed is his raw material and the cow is his machine. He delivers his raw material to his machine in the morning, and the machine deposits the product in the pail at night, and he knows the market value of it. He can thus regulate his expenses by his income, and does not have to run in debt; and, if he has a mortgage to lift, he can lay by each month the amount necessary to meet the engagement when it falls due. His employment continues the year round, no loafing around the bar room or the corner store, but continuous occupation with the satisfaction that he sees a sure return every day for his labor.

HOW TO ASSURE A WATER SUPPLY FOR CROPS.

By J. B. Reynolds, B A., Lecturer in Agricultural Physics, Ontario Agricultural College, Guelph.

In considering this subject, how to assure a water supply for crops, we should first try to realize how essential water is to the life and growth of plants. The plant is a helpless organism ; it is unable to move about in search of food, and it can take its food in only one form—the liquid. Water is the means that nature has provided to minister to the needs of the plant. It dissolves the food and carries that food to the roots of the plant. There are other functions performed by the water, and these might be stated as follows, with those already mentioned :



1. Water acts as a solvent of plant food.

2. It is a means for conveyance of that food to the roots of the plant.

3. It enters the plant by the roots, by a physical process known as *osmosis*, carrying the plant food with it.

4. Thence, by various means, it rises through the plant, distributing the food and imparting *turgidity* or stiffness to the parts of the plant.

5. It forms from 60 to 95 per cent. of the entire bulk of plants in the green state.

6. After the water has thus performed its part and has reached the extreme limits of the twigs and leaves, it *transpires*, i. e., passes off in the form of vapor.

From these considerations, we see how necessary is water in the soil. If there is a scarcity of water, the plant cannot get its food, no matter how rich the soil may be ; then, too, the plant immediately indicates a scarcity of water by losing its turgidity, and *wilting*.

After these few explanatory comments, let us examine into the means whereby we may secure a sufficient supply throughout the whole season. The subject naturally divides into two parts. First: We must lay in a good supply to begin with. That is, our soil should be in such a condition that it will hold a large supply of water. Secondly: We must so cultivate our soil as to prevent a too rapid escape of water during the growing season.

With regard to the first, that is, laying in a good supply, it might be objected that such a condition is entirely beyond our control, since it depends upon the amount of rain-fall and snow-fall, and upon the quality of our soil. True, we have not yet been able to regulate the rain-fall, but at any rate it may be safely claimed that *enough* rain and snow falls during autumn, winter and spring to make an abundant supply for the growing months, if none were lost. It is, therefore, to *preventing a loss* of the water that we must turn our attention. This depends largely upon the quality and condition of our soil, and our methods of working it. When the rain falls upon a coarse gravelly soil, it speedily disappears from the surface, and if we were to examine the interior to a depth of two or three feet, we should likely find that not a great deal of the water had been retained there. The same thing is true, to a less extent, of a sandy soil. But when rain falls upon a close, clayey soil, it does not penetrate so readily, and much more water is retained by the soil. Thus we see that soils are *close* or *porous*, have a *high retentive* power or a *low retentive* power, as the case may be. Is it possible to affect these conditions by methods of cultivation or other means? The results of some experiments conducted by the writer, will throw some light on this subject.

A number of small glass tubes, shown in the figure, contain soils of different textures. The particles of soil in each tube are of nearly uniform size. Those in No. 1 being very fine, those in No. 2 larger, and so on up to No. 5, where the particles are quite coarse, varying from $\frac{1}{25}$ to $\frac{2}{25}$ inch. in diameter. The lower end of each cylinder is fitted with a perforated rubber stopper and a small disk of linen, through which the water can pass, but not the soil. The tubes stand in water to the depth of about two inches as in the figure. The water rises through the dry soil by capillary action. The time required to rise the ten inches was noted. In the two coarser samples the water rose a few inches, then remained stationary. In the others, the water rose steadily until the whole was quite wet. The tubes and dry soil having been weighed, the amount of water absorbed was found by weighing after the experiment, and taking the difference between the weights when dry and when wet. The water capacity in the following table represents the volume of water absorbed, divided by the volume of soil containing the water:

Sample.	1.	2.	3.	4.	5.
Average diameter ..	$\frac{1}{100}$ $\frac{1}{1003}$ of an inch	$\frac{1}{200}$ $\frac{1}{400}$ of an inch.	$\frac{1}{100}$ $\frac{1}{200}$ of an inch.	$\frac{1}{25}$ $\frac{1}{50}$ of an inch	$\frac{2}{25}$ $\frac{1}{25}$ of an inch
Water capacity ..	55.4	48.9	38.06	29.56	28.58

The obvious significance of the experiment may be summarized thus:

1. The finer the soil, the more water it will hold.

2. The finer the soil, the more readily it will supply water to the roots of the crops, from the storehouse of water underneath.

3. The soil may be so loose and coarse that it fails to raise the water to the surface, where it is required.

Second experiment.

In the second experiment, humus and ordinary plasterers' sand were used. The humus was obtained in an almost pure sample from a low part of a field that had not been drained, and hence never cropped until quite recently. It was black in color, light

in weight, and contained nothing but decayed vegetable matter. These constituents (sand and humus) were mixed in the proportion mentioned in the table below, and six zinc cylinders, four of which are represented in the lower part of the figure, were filled each with a different sample. They were treated as in the previous experiment, the water being absorbed by capillarity.

THE RESULTS.

Sample.		1.	2.	3.	4.	5.	6.
Proportions	Sand	95	90	80	70	60	50
	Humus	5	10	20	30	40	50
Water capacity		39.2	46.6	52.6	53.5	56.1	61.9

Hence we observe that :

The greater the amount of humus in the soil, the greater the water-content, and the less the danger of drought.

Third experiment.

Three zinc cylinders, as in the figure, were filled, one with dry sand, one with dry clayey soil, and one with dry sand and humus, 50 per cent. of each. Some water containing ammonia was poured on the top of each and allowed to percolate through. The water that passed through was tested with the following results :

1. The water from the sand was found to contain nearly as much ammonia as that poured in at the top.

2. The water from the clay and that from the sand and humus mixed contained no trace of ammonia.

3. The water passed much more rapidly through the sand. Hence we observe :

1. That a sandy soil, deficient in humus, allows a great waste of plant food by leakage during fall, winter and spring. The sand has not the power to retain the plant food.

2. Clay and humus have the power of extracting the dissolved plant food from the water that passes through them.

3. Water does not pass as readily through clay and humus.

It is in order now to point out how these conditions are obtainable. Humus in the soil is a good thing, but how are we to get it there and keep it there? A fine soil is very desirable, but how can it be obtained when one happens to have a coarse sandy or gravelly soil?

Humus is, as every farmer knows, nothing more than decayed vegetable matter. This humus, in the process of time, decomposes, and furnishes the crops with their necessary food. Hence there is a continual decrease of this constituent, unless the farmer takes pains to restore it year by year. Briefly, because this is not properly a part of our subject, we may state the methods of keeping up the supply of humus in the soil :

1. To restore it to a worn out soil, plow under green crops.

2. To insure a constant supply, farm-yard manure should be applied. Hence, the sale of straw, hay and coarse grain is wasteful and in the end ruinous to the soil.

3. A proper system of rotation of crops will help to keep up a proportion of humus.

With regard to giving the soil the proper degree of fineness, it must be remembered that the same soil may be fine and coarse at different times. It largely depends on the

method of treatment. The finest clay soil may be made coarse and lumpy by injudicious treatment. A sandy soil, although the individual particles are coarser than those of a clay soil, is often more satisfactory and serviceable than clay, because the latter tends to become lumpy and thus the fineness of texture is lost. (The difference between a strong clay and a light sand is not that the clay or sand serves as food for the plant, but that the clay will *retain more water* and especially *more plant food* than the sand.) For this reason again the presence of humus is seen to be of great service, since it very materially increases the fineness of texture, the particles of humus being mostly very fine. Further to improve the texture, the one essential is cultivation, of the right sort and plenty of it. Farmers would do well to study the principles and methods of cultivation, with a view not merely to cover up the seed or to bury the manure, but to put the soil into proper condition to hold the greatest amount of moisture.

We have seen that good thorough cultivation, with plenty of humus in the soil, will assure a plentiful supply of water being retained by the soil during fall, winter and spring, and will prevent a loss of plant food by leaching. It now remains to consider briefly how this water may be conserved for the use of the plant. Besides the source of loss that we have already noticed, viz., leaching, there are mainly two others,—*evaporation* and *transpiration.*

Transpiration, if not a necessary, is at least an unavoidable process in plant growth. So long as there is water in the soil, the plants will transpire. But we can lessen the amount of transpiration by lessening the number of plants, and allowing only useful plants to grow. *Destroy all weeds*, since every weed is pumping out of the soil the water that should be held in reserve for your crops.

Loss of water by evaporation is caused by the surface-water turning to vapor and escaping. Then, the capillary movement of water being always from wet to dry soil, the subsoil water moves up and is in turn evaporated. The only means of preventing this upward procession is to loosen up the soil at the surface. This widens the distance from particle to particle, and prevents the water from leaping from one to another, as it does when the soil is very compact. *Be careful in your use of the roller.* Do not forget that the roller, while it pulverizes the soil, also packs it, and hence encourages evaporation. If it is necessary to roll the soil after or during seeding, it would be well to use the harrow after the roller, in order to loosen the surface again. Of course there are times when this is not practicable, as in sowing turnips, but the roller is often used when it is not necessary, as when the soil is sufficiently pulverized when seeding. Then the roller is an injury rather than a benefit. For hoed crops, frequent shallow cultivation, as frequent as possible, especially in dry weather, is a necessary practice. Keep the soil between the rows loose ; then if the water must escape, it will do so by way of the roots, stalk and leaves of the plant.

To sum up the practical issues :

1. Cultivate the land thoroughly and judiciously, to assure a fine texture. Work for a firm, close subsoil, since that condition, within reasonable limits, is the most favorable both for holding water and for conveying it to the plant-roots.

2. While a firm subsoil is desirable, a loose surface mulch is equally desirable, in order to prevent the loss of water by evaporation. Practice frequent shallow cultivation for all crops that admit it, and be cautious in using the roller, since its use encourages evaporation.

3. Destroy all weeds, as they waste both the soil-fertility and the soil-water.

4. Keep up a plentiful supply of humus.

WATER SUPPLY FOR CROPS IN DROUTH.

By E. F. White, B.S.A., Richard's Landing.

If we put the end of a small glass tube into water the water will rise in it. If, instead of being put in water, a tube is put into a very heavy liquid, such as mercury, instead of rising above the surrounding liquid it will not rise up in the tube to its level (see Fig. 1 and 2). The finer these tubes are the higher the water will rise, while the opposite will be the result in the case of the mercury. That which causes the water to rise is called capillary attraction. That which prevents the mercury from rising is called capillary repulsion. Before going anyfurther it might be interesting to some to explain the meaning of capillary. Thewoid capillus means hair. Capillary means resembling a hair, fine, minute, small in diameter, though long. Thus a capillary tube means a tube that is hair-like. A glass tube has been taken for purposes of illustration, but you must not think that such a tube is necessary before water will rise. A sponge soaks up water; that is, water rises through and fills the minute spaces which exist in the structure of the sponge. Those large spaces which we so plainly see in it are not filled with water. The oil rises in the lamp wick by capillary attraction. The minute spaces between the fibres of the lamp wick serve the same purpose as the small hole in the glass tube. The finer the material in the wick, the smaller and more numerous the holes will be and the higher the oil will rise through it. When house plants are watered very often the water is put into the saucer of the flower pot. We say the soil soaks the water up; in fact, the water rises through the spaces between the particles of soil (see Fig. 3). The finer the soil the smaller these spaces will be and the higher the water will rise, as it did in the glass tubes. It is well known that plants on a sandy soil suffer during a dry season much more than those on a clay or loamy soil do. This is due to the spaces in the latter being much finer than those in the sand, as the particles are not nearly so large. This being the case, they hold the water much better when they have it, and then the water will rise much more readily from the water level. In this way, during a dry time the plants on clay may be getting water from below, while those on sandy land may die for want of it.

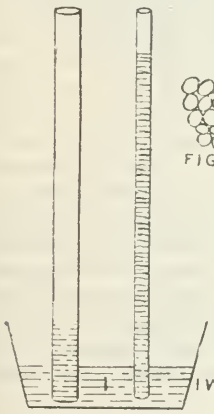


FIG. 1

FIG 3

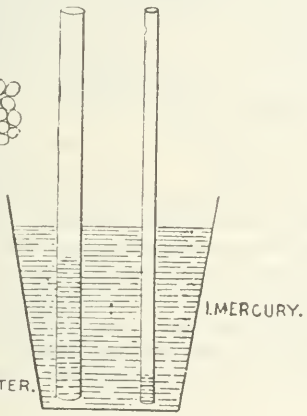


FIG. 2.

Now if we understand some of the forces which influence the rise of water in a substance, we need to know two more things, and then this knowledge may be useful on the farm. First, what can we do to put the soil into a condition that is favorable to the rise of water from the water level; then what can we do to prevent it from evaporating at the top, so that the crop may get the benefit of the moisture? The spaces need to be small. Thus, to roll land that is too loose, as sand or other land that has been plowed in the spring, is a benefit. Again, many will have noticed that land that is drained never suffers as much during a dry season as does undrained land. I have seen places where a person could distinctly notice that the crop beside a drain was better during a drouth than the crop farther off. What is the reason of this? An underdrain never takes water away that rises by capillary attraction, but that which lies in the larger spaces, and which, if allowed to remain, is injurious to plant growth. Land that is not drained will often be water soaked during part of the season; and when it dries out, will leave the land full of cracks, which tend to prevent the water from coming up, and allow it to evaporate

more quickly. On the other hand, land that is well drained is left in a condition much more favorable to the rise of water by capillary attraction from the water level.

After doing as much as we can to put the soil into a condition favorable to the rise of this moisture, we need to do as much as we can to hinder its evaporation at the surface. Most farmers have seen a mulch of rubbish, chips, straw, or some other loose material put around fruit trees to keep the ground moist in dry weather. The water does not rise through this loose stuff, and is largely protected from the wind and sun's rays and does not evaporate; as a consequence the soil keeps moist. A well-worked summer fallow, on clay or loamy soil, will be moist even if rain has not fallen for some weeks. The same way with land in roots or corn if they are scuffled every few days. Not so if they are only cultivated now and then, when the weeds seem to demand it.

Now, some may say that land that is worked up dries out. That is true in regard to the portion of the soil that is worked; but this need be only one, two, or three inches, and these few inches of loose soil at the top serve the same purpose as the chips and the like around the fruit trees. It prevents the moisture from coming right to the top and protects it from being evaporated by the wind and sun. In this way we keep it in the proper place for the plant to make use of it. This explains the reason that there is such an advantage in surface cultivation during dry weather. The drier the weather, the oftener will it pay us to cultivate such crops as permit of it. For instance, take corn. It is a very simple and easy thing to plant it so that it can be cultivated both ways with a horse. Last year we planted corn. Shortly after it came up we commenced to cultivate it, and during the dry season it was cultivated every week. It grew straight ahead, and did not suffer in the least from dry weather. We saw many other fields that seemed to have been cultivated only now and then to keep down the weeds, and they certainly showed to have suffered. Potatoes and roots were the same. By constant stirring of the surface soil much can be done to compensate for lack of rain. Generally speaking, if the rainfall is abundant during the summer we have good crops; if not, our crops are poor. People often think of the moisture in the soil as altogether due to rainfall; and as they cannot control this, they have thought that they could not guard against loss by drouth; but by understanding capillary attraction and how to avail ourselves of its aid, we will be able, in many cases, to greatly lessen the evils which result from a lack of rain.

FARM BARNS AND HOW TO BUILD THEM.

By W. S. Woodward, Lockport N.Y.

In no one thing do farmers use less thought than in the construction of farm barns. Each country has a style of its own, and all the barns in that territory are patterned after that model. In some sections, all the barns have gambrel roofs; in others, all are "over-hung," or, as called in Pennsylvania, "over-shot," that is, the barn on one side projects several feet over the basement, forming a sort of porch. In other places barns are all angles and L's, with as many corners and valleys as a modern house. No matter how unhandy or inconvenient the style may be, every man blindly follows, with no thought as to how he could use less material in housing the same contents, or how much time or how many steps he could save in caring for the stock. Barns should be built with two ideas in view,—to furnish storage for the crops of the farm and to house the stock during the winter, and to do these at the lowest cost and in the most substantial and convenient way. In planning the barn, it should be remembered that the roof and outside boarding are the greatest source of expense, and that the higher the barn the greater storage capacity under the roof, and that the nearer square the less outside needed to surround the space.

Gambrel roofs are now very fashionable, but aside from the barn with many L's and corners, they are the most expensive and unhandy of all; nearly half the expense is from the main plate up, and the upper space is so filled with timber and so unhandy to reach that it is of but little value for storage. In my travels as an Institute worker, I have

had large observation of farm barns, and have built, or remodelled the barns of five farms. I consider the last one built pretty nearly a "common sense" barn.

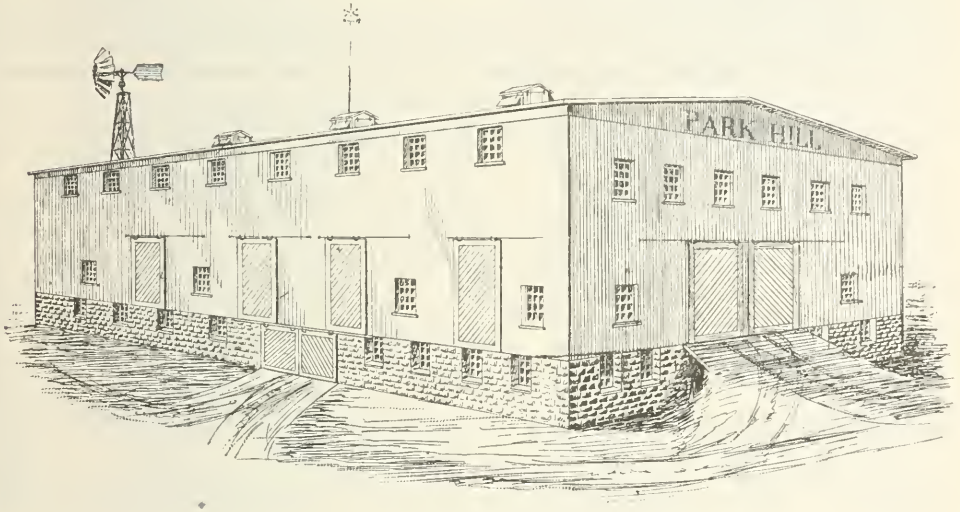


Fig. 1.—Elevation.

I bought a farm with five barns situated about an open barn-yard. In a shower, soon after I came into possession, lightning struck one of them and in an hour there was not a stick of any of them left. On figuring to replace them, I found that the outside line of the old barns was 832 feet; that figured at the height of each there was 14,842 feet of siding; that while the floor space, or area, was only 10,500 feet there was nearly 14,000 feet of roofing, while the cubic contents was only 168,000 feet, and that it was, like all barns so built, very unhandy. As the farm contained 266 acres of good land and I wanted the barn to house all the produce of the farm, and stock enough in winter, to consume it, I made the new barn 96 feet wide and 160 feet long with 30 ft. posts, above a 9 ft. basement. As the roof would cost no more to cover the main floor and basement, and by having a basement I could use the whole of the main floor for storage, I put a 9 foot basement under the whole barn. In order to give ample storage the posts were made 30 feet long; and to save expense and have storage space most available, a flat roof was put on. It will be readily seen that the new barn would only have 512 feet length of base walls, or 320 less than those it was to replace. It took 15,360 feet of outside boarding, or only 518 feet more than the old ones. The new barn would have 15,360 feet of floor space; 4,860 feet, or nearly fifty per cent. more than the old, and one foot of siding would enclose one foot of floor space. While the new barn would have fifty per cent. more floor area, it would have only about 2,000 feet more roof. Its storage capacity would be 460,800 cubic feet, or nearly three times as much as the five barns it replaced. As mows of hay or grain 30 feet deep would be very heavy, hardwood posts 10 x 10 were put under the whole, 16 feet apart each way, with heavy summer sills running across the barn with hardwood headers, 6 feet long, on top the posts. The floor joists are 3 x 12, one foot apart, and rest full size on top of summer sills. The foot of the basement posts rests on stone piers, each one of which is capped with a single stone heavily coated on top with thick paint to entirely prevent moisture going up into the post. It was not necessary to have so much timber in main barn posts, as nothing would ever rest on them but the roof, and so 10 x 10 posts were used 32 feet apart in bents and the bents 20 feet apart. In this barn there are no cross timbers either way from floor to roof except in the bents, and in them none from the floor up to within 4 feet of the roof. As will be seen, if basement bents were 16 feet and upper one 20 feet distant, a part of the upper posts would not rest or stand directly over those in basement. Now, to make a strong support for foot of upper posts not resting on those below, 6 floor joists were placed side by side and bolted together and braces from these run to lower posts.

When the barn was finished there was nothing inside on the main floor but fourteen 10 x 10 posts running up to the roof.

In Fig. 2 can be seen the manner of framing truss to support the roof. While the distance from post to post is 32 feet, and the rafters on which roof joist rest are only 4 x 10 and lie flat on posts, the truss braces are so put in that these rafters are supported

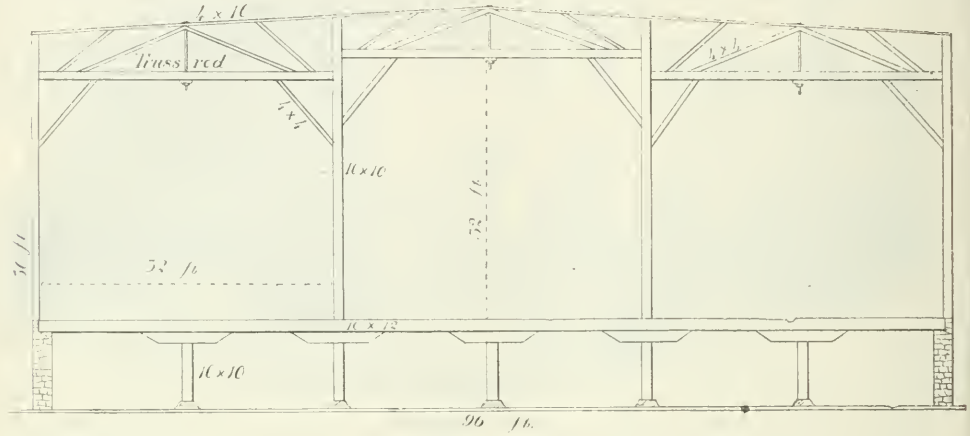


Fig. 2.

every eight feet, which makes them strong enough to support any amount of snow that could possibly accumulate. All the braces shown are 4 x 4 in pairs, with a two-inch space between. The roof joists are 2 x 12 and placed 16 inches apart, double bridged. The roof slants from the middle each way one-half inch to the foot. It is covered with inch pine, matched, and well nailed to joists. A roll of best tarred roofling felt was then sawed in two one-third the way from one end. Commencing at lower edge of roof a strip of roof boards as wide as the narrow part of the felt was coated with hot pitch, and while hot, the felt rolled on. Next commencing again at edge was put another coat of pitch the width of the two-thirds part of roll, and this rolled on while hot. Again commencing at edge a strip of roof full width of roll of felt was pitched and felt rolled on while pitch was hot. Now a line was struck up one-third width of full roll and covered with pitch and felt rolled on while the pitch was still hot. This was continued until the roof was covered.

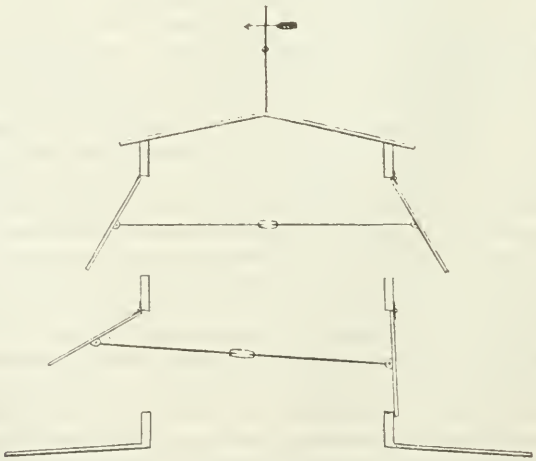


Fig. 3.

The roof now had three coats of pitch and three thicknesses of felt put on, lapped like shingles, and firmly cemented to the roof boards with pitch. The lower edges of the felt

were now nailed every two inches with one inch tin caps under nail heads. Over the whole was spread one-sixteenth inch of hot pitch, and into this was stamped all the coarse, clean, sharp gravel it would hold. The pitch holds the gravel and the gravel protects the pitch, and although this roof has been on now eight years it looks as good as the day it was finished, and looks good for years and years to come. The reason for using three coats of single ply felt instead of one coat of three ply, was that in this way no imperfections going clear through the roof are possible, and the whole is made solid and cemented to the roof boarding.

Another new feature in this barn is the floor. When the barn was built, good two-inch pine planks were worth $20 per thousand, with one-fifth added for matching; or grooved with hardwood tongues $28 per thousand. To have used either of these, two inches thick would have made the floor cost $50 or $56 per thousand feet, surface measure. By buying best quality inch hemlock, well, seasoned at $10; best Norway pine, seasoned, surfaced, and jointed to width, not matched, at $14; the best waterproof paper at $2;—each per thousand—and by laying hemlock below, paper between, and Norway on surface, breaking the joints in the two thicknesses of lumber, we got the floor for $26 per thousand. By putting three three-inch nails in each board in each joist of first boarding, and three four-inch nails in each joist of surface, our floor has never "humped," a thing which it is impossible to prevent where plank is used; and then the floor is absolutely moisture proof a thing not to be obtained by any system of single planking; and where stock is kept in the basement, and the floors of a single thickness, I have always seen let enough dampness go through to spoil grain or hay when lying on the floor.

Another feature of this barn entirely new is the manner of ventilation, or more particularly the cowl or hood that surmounts the ventilating chutes or trunks. As a rule the ventilation of barns and stables is very deficient. Few chutes are more than twelve or fifteen inches square, and in all these small chutes the friction on the sides is so much and they become so filled with cobwebs that but little or no air can pass up. No ventilating trunk should be less than thirty inches square inside. Three or four feet is better, and they should be provided with a valve at the bottom by which the outgo of air can be regulated. With scarcely an exception all the tops, or cowls, or hoods, in which ventilators end at the roof, are slatted like window blinds. Nothing could be worse, for when the wind blows from any direction of course the pressure on that side will force in twice as much air as will pass out on the opposite, and as a result a downward, instead of an upward, current is created and no ventilation is secured. As proof that this is true the wet space, or pile of snow, always found under the slatted tops after every storm is conclusive. Occasionally a cowl like those on the hop kilns is seen, but they are not large enough, are expensive, and do not look well, and so I devised one that looks well and works like a charm. It may be four, six, or eight sided, no matter so the sides are in pairs opposite. The one shown in Fig. 3 is four sided, designed to fit our flat roofed barn. Instead of slats each side is made of horizontal doors, one on each, or as many as desirable—the one shown has two. They are made light but strong, and hung at the top with strap-hinges working very loosely. Each pair, opposite each other, are connected together with a light rod or bar, the ends connected to the middle of doors with loose hinges. These rods should be just long enough so that on a still day the doors will be held out about 30 degrees, as shown in upper pair, which will afford all the ventilation that can be had at such a time. Now when the wind blows from any direction the door on windward side will be closed and this will force out the opposite one to sixty degrees, as shown in lower pair, and the wind in blowing about the cupola will by suction create a strong upward current, so strong, in a three foot chute with brisk wind, as to almost carry up a man's hat. If desired these doors may be made of frames with glass panels to afford light in cupola or barn. In that case they should have a wide middle piece to which the connecting rod may be fastened. If so wished these connecting pieces may be made with a joint in the middle having a strap-hinge on bottom side that will form a taggle joint. Now by having a cord fastened to the middle with one end running up over a pulley in the centre of the roof and hanging down in some convenient place within reach, the windows or doors can both be drawn tight—shut by simply pulling on the end of this cord and raising the middle of connecting rod. When desirable to open them it can be done by pulling the other end of the cord,

and the weight when down straight will keep them open. The windows of the barn in the upper tier have the lower sash attached to a cord by passing up over a pulley in the top of the frame and coming down within reach from the floor so the windows can be raised from the floor and they will close of their own weight by simply loosening the cord.

This barn is sided with first quality white pine, cut six inches wide and matched, and given two coats of paint. When we thresh we use a swinging stacker which saves three men on straw mows, and by moving the machine and running driving belts from the engine through the doors we can have our straw all under cover, and good straw is worth far too much as feed to be piled up out of doors as is so commonly done. This barn has two large granaries and two silos, and is also provided with a water tank eight feet in diameter and twelve feet high as shown in Fig. 4, filled by the windmill which stands over a well just beyond the end of the barn, and water is carried all over the basement and to and through the house from this tank. There is no hill or bank to afford entrance to the main floor

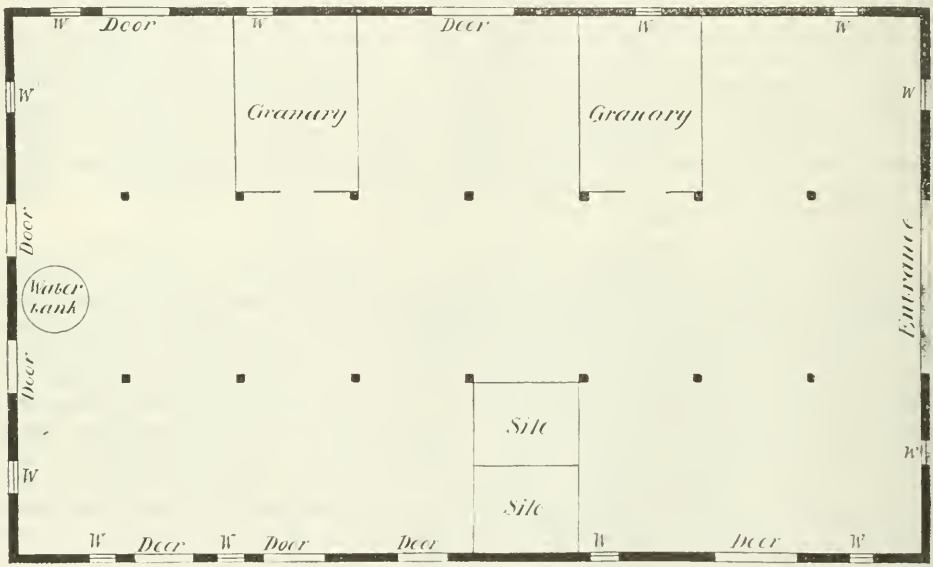


Fig. 4.—Ground floor.

as it stands on level ground, but a wall was built back twelve feet from the end, of proper height, and an embankment made up to the top of this, and from there to the floor a bridge of planks was made. For the long bridge to double doors six pieces of railroad rails with wooden stringers between, and one on each end were used; the iron to support the weight, and the wood to which to nail the planks to keep them in place.

Nothing has been said of the internal arrangement of this barn basement, as that is a matter to be varied according to the system of farming adopted. The intention has been to describe the features new in barn construction. It has now been eight years in practical use, and the only change for the better that experience could suggest would be the making of the basement ten feet high instead of nine.

NOTE.—We show a view of this barn made from sketch and measurements furnished by Mr. Woodward the barn being so surrounded by trees that it is not possible to get a photograph of it.

LIVE STOCK DEPARTMENT.

TUBERCULOSIS.

By F. C. Harrison, Bacteriologist, O. A. C., Guelph.

Tuberculosis is an infectious and inoculable disease, common to man and to all domestic animals, due to the presence in the tissues of the bacillus of Koch.

Historical. The history of tuberculosis is quite an interesting one. The earliest part of it gives a very crude account of its etiology, pathology, and treatment; while that part which covers the last decade and a half, is full of startling revelations and discoveries. During the time of Hippocrates, some general facts were known, but it was not until the beginning of the nineteenth century that all the various lesions which are now known to be tubercular were suspected to originate from one source. About 1800, Laennec, by a stroke of genius, and profiting from the labors of his predecessors, demonstrated the unity of the tubercular process and its various products, such as the rounded granulations, the grey tubercles, the calcareous nodules and caseous foci. Villemin, in 1865, demonstrated the contagious nature of the disease. Volkmann, König, Billroth and others made valuable contributions to the search for the cause of these lesions, but it was not until 1882 that Robert Koch isolated and described the bacillus of tuberculosis, and proved conclusively that all the lesions characteristic of tuberculosis were due to this one microbe.

Different Names of the Disease. Older German veterinary surgeons called tuberculosis "*Meerlinsigkeit*" or "Duckweed," from the fancied resemblance of the disease in the serous membrane to the dense masses of oval leaves floating on stagnant water. Later, German writers called it "*Perslucht*" or "Pearl Disease." The French name used to be "*Pommeliere*" or "Potato Disease." The Scotch used to call it "Angle Berries,' and in England the disease was called "Grapes." To-day the commonest names are tuberculosis and consumption, the latter word being most frequently used when speaking of the disease in the human subject.*

Bacteriology. The bacillus of Koch appears as a short fine rod, often slightly bent or curved. It stains slowly with basic aniline dyes. It is aerobic, (requires free oxygen), and may be cultivated artificially at temperatures about blood heat, 98° to 103° F. These cultures are difficult to obtain directly from tubercular lesions, but it becomes easy to obtain good cultures when the bacillus, by successive passages, is accustomed to growing upon artificial culture media, such as beef broth with the addition of peptone and glycerine.

Specific Origin of Tuberculosis. The identity of tuberculosis in different species of animals was experimentally shown before the discovery of the bacillus. In animals inoculated with tuberculous matter coming from man or cattle, Villemin and his successors established an infection of the same type and with identical lesions. Chauveau, (1870), infected three young oxen by the ingestion of tuberculous matter taken from man, and the lesions produced from this infection were identical with those which were produced by the injection of tuberculous matter taken from oxen. Klebs, (1870), Bollinger, (1873), Kitt, (1880), Putz, (1882), and others confirmed these experiments or performed others quite similar. In 1875, Gerlach injected the calf, pig, sheep, goat and a horse with tuberculous matter taken from the ox. He infected pigs and dogs with human tuberculosis. He concluded from his experiments, that the same virus was transmissible

*Free use has been made of Nocard & Leclanche "Les Maladies Microbiennes des Animaux," and Nocard's "Les Tuberculoses Animales," in the preparation of this article.

from one species to another. The discovery of Koch's bacillus and its constant presence in the specific lesions in every species finally established the unity of tuberculosis.

Species Affected. Tuberculosis affects all domestic animals, but with different degrees of virulence. Cattle are most liable to the disease, and for a long time they were considered the only animals likely to contract tuberculosis. The pig is very commonly affected, although not so commonly in this country as in Europe. Among apes and monkeys in the wild state, tuberculosis is unknown, but in confinement, as in Zoological Gardens, it is the most formidable disease with which the authorities have to contend. Horses are rarely attacked, and in sheep and goats the disease is still more rare. Tuberculosis has been seen in the camel; both in Egypt and in the Kirghese steppes. The zebra and the giraffe have also been found affected. In the dog and cat the disease is very rare, and among savage carnivora in zoological establishments, cases have been noted; in the lion, (five observations), the tiger, (two observations), the panther, (two observations), also in the jaguar, jackal and the polar fox. Amongst birds, fowls, pheasants, and ducks, are the most liable to the disease. Birds of flight and parrots are very frequently tuberculous.

Geographical Distribution. Tuberculosis of cattle is found in nearly all parts of the globe. Statistics are not sufficiently precise to give one an exact idea of the distribution of the disease. In France, the absence of official figures only permits a very approximate estimate as to the frequency of bovine tuberculosis. The disease is rare in Normandy, Auvergne and Limousin, but in the Hautes Vosges, 30-40 per cent. of the cows are tuberculous. In Champagne, Lorraine and Brie, 15 20 per cent. of the cows are tuberculous. In Belgium, Van Hertsen thinks that 4 per cent. of the cows are tuberculous. In Switzerland, Berdez admits an infection of about 5 per cent. In Germany, a number of areas are very badly affected, whilst others are comparatively free. In Prussia, 5 per cent.; in Saxony, 25 per cent. for cows; Hanover, 1.2 per cent.; Mecklenberg, 35 per cent. (Wilbrandt). In Great Britain in 1890, the Minister of Agriculture declared that the percentage of tuberculous cattle varied from 3 to 17 per cent. In Holland, tuberculosis is frequent in the distillery districts of Rotterdam, about 20 per cent. being affected. (Schmidt). In Denmark, tuberculosis is very prevalent. In some localities the proportion is as high as 50 to 90 per cent., whilst in others the disease is unknown. Austria furnishes few statistics. In 1890, in six slaughter houses in one district, there were 1,514 cases in 84,238 animals, a proportion of 1.8 per cent. In Italy, tuberculosis is found in every province, and is common in a number of districts. At Milan, 10 per cent. of the adult animals slaughtered, are tuberculous. In Russia, the disease is almost unknown on the steppes. Statistics from Moscow shew from 1 to 5.5 per cent. of the animals slaughtered to be tuberculous. In North Africa, tuberculosis appears very rarely in the indigenous races, but is found in the imported European animals; and in the Transvaal is unknown, or at least comparatively rare. In Japan, the statement made regarding North Africa also holds good. In the United States, tuberculosis is found more especially in the east. In the state of New York, Blain found 21 per cent. tuberculosis in a total of 4,000 animals examined, (1887). Statistics of 1892 3 by a commission to examine farm animals, gave from .35 per cent. to 1 per cent. as tuberculous. In the dairies of Massachusetts, the proportion of tuberculous cows is 2 per cent. to 3 per cent. In Mexico and Chili, tuberculosis is very abundant, in the latter place decimating the herds. In Australia, an official commission in 1886 gave the proportion of affected animals as 2 per cent. in the colony of Victoria. Tuberculosis of the pig is commonest in Germany. In 1893-4, out of 2,159,302 pigs slaughtered, 14,266 were tuberculous,—about .66 per cent., (.74 per cent. in 1891-2 and 1 per cent. in 1892-3). In Russia, the disease is increasing every year.

Tuberculosis of the horse is not menacing. It constitutes a very exceptional disease. In knacker's yards the proportion is one per 10,000. Sheep; only of importance in Germany, the proprotion of tuberculous sheep being from .07 to .11%. Amongst birds, (fowls, pheasants, etc.,) the disease is very frequent in Europe. Wally, Fleming and McFayden are all convinced that the disease is spreading in Great Britain. Bang has shown in an excellent paper, that in 1789 the disease was only known in Denmark by name.

In 1790 some cows in Copenhagen were found affected, but even in 1818 the malady was still extremely rare. It was not till 1840 that tuberculosis began to increase, first among the animals of Schleswig and Holstein. In 1850 large numbers of cattle were imported, and with them the disease spread through the whole country. In Germany, Rieck and Wilbrandt also insist on the regular progression of tuberculosis.

Statistics from Leipsic Slaughter Houses; Shewing the Increase of Tuberculosis.

——	Bulls.	Steers.	Cows.
1889	11.8	13.7	19.4
1890	17.8	20.9	27.8
1891	18.4	27.7	31.1
1892	16.81	26.2	32.56
1893	18.77	25.76	35.09
1894	20.33	25.19	38.65

In Holland, France and Russia the inspectors of slaughter houses also signalize a gradual increase in the frequency of the disease. In Victoria, Australia, where tuberculosis was unknown twenty-five to thirty years ago, to-day fifteen to twenty per cent. of the animals slaughtered are tuberculous.

Symptoms in Cattle. Medical men *may* recognize incipient tuberculosis in man fairly easily, but in cattle recognition of the disease is far harder. The thickness of the skin and chest walls, the fact that the fore limbs cover a large extent of the lung surface, the presence of hair and the noises of the rumen all tend to make a careful examination of the lung impossible. Occasionally the animal will cough, and if the temperature be taken daily, sudden and temporary rises of 1 to 2° F. will often be noticed. After a time the disease becomes more pronounced, the skin becomes dull and bristly, pressure on the ribs or region of the kidneys causes coughing and pain. The cough is more pronounced, hoarse, and painful. Occasionally during fits of coughing mucus may be forcibly discharged from the mouth or nostrils, and is seen to be of a thick, viscid, yellowish character. Of course a microscopical examination of this mucus readily establishes the diagnosis. More often the mucus is not discharged after coughing but is swallowed, and the animal may in this way set up tuberculosis of the intestine, liver, etc. Respiration is more hurried, appetite becomes capricious, and percussion of the lungs may give off a dull sound. In the last stages the disease progresses with much rapidity. Wasting away of the animal's substance is very noticeable; the skin becomes bound to the bones, the eyes become sunken and a yellowish discharge escapes from the nostrils. The breathing is quickened, coughing frequent and percussion reveals large areas of dulness. Death ensues from exhaustion or asphyxia.

Tuberculosis of the Udder. Out of 100 tuberculous cows, not more than three or four have tuberculosis of the udder (Bang). When present, the udder becomes hard and swollen, unaccompanied by heat or tenderness. The milk remains normal for a time, but later becomes serous and yellowish and may contain tubercle bacilli. Finally the udder runs dry altogther and the tissue of the udder becomes tough and of wooden hardness.

Diagnosis by Tuberculin.

From what has been said above, it is easy to see how difficult it is to make a correct diagnosis of tuberculosis by physical symptoms. Fortunately there has been introduced a substance which makes detection of the disease comparatively easy. Tuberculin, first made by Koch in 1890, is now used universally for finding out the presence of tuberculosis in animals. Tuberculin is a brown thick liquid which possesses the odor of flowers, and and is simply an evaporated extract of culture of the tubercle bacillus grown in beef broth

to which glycerine has been added. By the subcutaneous injection of small amounts of tuberculin, a fever re-action is set up in tuberculous animals; and when this re-action gives a rise of two degrees Fahrenheit above the highest normal temperature of the animal, it is looked upon as a clear indication of tuberculosis.

Transmission to Man. The transmission of tuberculosis from animals to man has already been pointed out and on account of the importance of this phase of the subject, a rather fuller account will be given of statistics and facts reported by different investigators. The transmission of the disease from animals to man results from (1) accidental inoculation of virulent matter; (2) from contact with diseased animals; (3) from the ingestion of virulent animal products as meat and milk.

(1) *Inoculation.* Several accounts are reported which demonstrate the accidental inoculation of tuberculosis of animals into man. Tcherning, of Copenhagen, reports the case of a veterinary surgeon who had wounded himself in the finger while making a post-mortem examination of a tuberculous cow. Three weeks after the accident the wound became swollen and suppurated, and Tcherning operated and cut out the whole of the swollen part, in which he found tubercular nodules, and bacilli. (Nocard.) Again, another veterinary surgeon in Germany wounded himself deeply in the thumb whilst making a post mortem on a tuberculous cow. Six months later cutaneous tuberculosis was diagnosed at the site of the scar, and six months after he developed tuberculosis of the lung and died two years later. At the post mortem, tuberculosis of the inoculated thumb and lung were found. (Nocard.) Butchers are frequently exposed to cutaneous inoculations, but it is necessary to explain that tuberculous virus develops with difficulty in the skin, and that superficial wounds are not dangerous. Deep inoculations, punctures, and deep cuts may be attended with serious results. They may end in a localized infection, as in the first case cited, or in a generalization of the lesions, as in the second case.

(2) *Contact.* Everything that we know points to the fact that habitual and prolonged cohabitation constitutes the ordinary method of contagion. Transmission is effected between animals of the same species, or of different species; it is effected also from man *to* animals; and the possibility of the contamination of man *by* animals is also evident, but the extent of this infection is undecided. M. Bigoteau, of Auneau, France mentions that thirty one of his clients had stables infected with tuberculosis, and nineteen of them saw the disease successively attack one to four members of their families. "In a farm at Beauce, France, the stable, which was admirably kept, and quoted in the district as a model, contained 24 cows and one bull, all in good condition. Tuberculosis had never been known in the stable, when in 1886 two cows began to cough. It was decided to get rid of them, and they were put to fatten; they remained in bad condition, however, and were delivered over to the butcher. They were tuberculous to such an extent that one of them had to be condemned. Soon some of the rest of the cattle began to cough, a second, and a third, and so on; and all the cows of the same row were attacked one after the other. They were sent to the slaughter house as soon as they became ill, but the disease persisted, and in August, 1892, tuberculin was injected and showed that of 20 animals composing one herd, 7 were tuberculous. All these seven belonged to the same row, the twelve in the other row being quite sound. The autopsy of the seven animals confirmed the diagnosis. How had the stable been contaminated? After a careful enquiry, it was ascertained that three years before the recognition of the first case, a cowherd had been engaged, a painstaking man, who was in bad health and had already been in the hospital for tuberculosis (pulmonary phthisis). This man who used to cough and expectorate constantly, slept in the stable immediately over the two cows which were first recognized to be ill, and there seems to be no doubt that these two cows in question were contaminated by matters expectorated or vomited during the night by the consumptive cowherd." (Nocard.)

(3) *Infection from Eating Tuberculous Meat.* The meat of cattle suffering from tuberculosis, even when the disease is generalized, only rarely contains tubercle bacilli, and when it does, only contains a very small number of them. In support of this statement, the experience of Nocard and others may be cited. Nocard fed several litters of kittens on the meat of cattle condemned at the slaughter houses for general tuberculosis

None of them ever became tuberculous. All the kittens which ate a small portion of tuberculous lung or liver, succumbed to abdominal tuberculosis after periods varying from six weeks to five months. Four cats ate about 4 lbs. of raw chopped meat taken from the muscles of a cow condemned for general tuberculosis. None of the animals became tuberculous. Galtier gives the following. Two pigs, five to six months old, were able to eat with impunity considerable quantities of condemned meat. The result is impressive from the fact that two out of the fourteen samples of the meat used for the experiment caused tuberculosis in rabbits when the juice was inoculated. Perroncito fed eighteen young pigs for three, four and five months on meat from tuberculosis cattle condemned at the slaughterhouse at Turin, Italy; at the autopsy none of these animals were found to be tuberculous. In Germany an order dated 1892 has gone into effect, which concludes this matter, and sums up what the highest authorities think of infection from the ingestion of the meat of tuberculous animals: "The meat of tuberculous animals is to be declared *unwholesome* when there exists tubercular nodules in the muscles, and also when, without the existence of nodules in the muscles, the meat comes from a wasted animal. On the other hand, the meat of tuberculous animals is to be declared *not unwholesome* if, the animal being in good condition, the tubercular nodules exist in one organ alone, or in two or more organs which are in connection with one another, either directly or by means of blood vessels, *which do not belong to the general circulation.* In fact the very numerous experiments made in Berlin and in a great many German universities prove that, with the exception of the very rare cases in which the tubercular nodules are found in the muscles, the indigestion of meat from tuberculous animals is powerless to transmit tuberculosis."

(4) Infection from Drinking Tuberculous Milk. The presence of tubercle bacilli in milk has been demonstrated by Koch, Bank, Johne, Bollinger, Ernst, Woodhead, and many others, in the milk of animals suffering from tubercular disease of the udder. Martin (in British Medical Journal) from his experiments, found that milk was infective only when the udder was diseased, and Nocard also reached this conclusion. Theobald Smith, (U. S. Department of Agriculture), from a number of experiments, found that the tubercle bacilli may be present in the milk of tuberculous cows when the udder, so far as the eye could tell, contained no signs of disease. Ernst (Report Mass. Society for Promoting Agriculture) declares that milk from cows affected with tuberculosis in any part of the body may contain the germs of the disease, whether there is disease of the udder or not. In short, the general results of inoculation experiments would seem to indicate that milk may prove infectious in a small number of cases, and that the infectious qualities are the greatest with milk from animals suffering from tuberculosis of the udder, and next from those infected with general tuberculosis. It might be well to mention that the drinking of virulent milk is dangerous only when the milk contains a great number of germs and is taken in considerable quantity, but when such milk becomes diluted with fifty times its volume of sound milk, it lessens the danger of infection very materially. Practically, the danger from the ingestion of virulent milk exists for persons who use it as their principal food, infants, young children, and some invalids. In order to avoid all danger, it is necessary either to heat the milk at 158° F. for twenty minutes or just bring to the boil. With regard to milk products, butter and cheese, practically no danger exists in eating these, because the milk of any tuberculous animal would be very largely diluted with healthy milk; and Bang's experiments have shown that most of the bacilli are carried off in the buttermilk and whey, though a certain number will always remain in the butter and cheese.

Heredity. Koch declares that he has never seen his female Guinea pigs when tuberculous transmit the disease to their offspring. The statistics of the slaughter houses all agree in the fact that tuberculosis of the calf is very rare. At the Munich slaughter house out of 160,000 calves slaughtered yearly, there have been found tuberculous,—2 in 1878; 1 in 1879; 0 in 1880; 0 in 1881; 2 in 1882. At Lyons, out of 400,000 slaughtered, 5 calves were tuberculous. Bang in his extensive practise, has only seen 28 cases in the newly born calf. From these facts and others of like nature, Nocard's conclusion is that "It is true that the germ of tuberculosis may sometimes pass from mother to foetus; it is none the less true that this passage is an absolutely exceptional thing.

What the mother does transmit to her offspring is not the disease itself, but the predisposition or proneness to contract the disease." From observance of these facts, Bang has experimented and shown how it is possible to build up a healthy herd from one badly infected with tuberculosis. Briefly, his experiments at the farm of Thurebyvill, in Zealand, are as follows: In April 1892, the entire herd of 208 animals were tested with tuberculin, and 80 per cent. of the milch cows, and 40 per cent. of the bulls, heifers, and calves reacted. While the herd was out at grass, the entire stable was carefully disinfected, and this operation was afterwards repeated every spring. The stable was separated into two divisions by erecting a wooden partition from floor to ceiling across the stable. The side was covered with building paper. Different implements and separate stable hands were provided for the two divisions. The healthy section of the herd was tested twice a year, and the calves of the tuberculous section as soon after birth as possible. These calves, if healthy, were at once removed to the healthy division. In April 1892, there were 131 animals in the reacting division, and 77 in the healthy division. In October 1892, the healthy section was tested with tuberculin, and 7 animals out of the 77 re acted and were removed to the re acting division. In May 1893, the healthy section consisted of 103 animals, of which 10 re-acted and were removed to the tuberculous section. After this, isolation of the two sections was enforced more rigorously. In October 1893, the healthy section consisted of 107 animals, of which 1 re-acted. May 1894, the healthy section consisted of 122 animals, of which 2 re-acted. October 1894, the healthy section consisted of 119 animals, of which 1 was suspicious. May 1895, the healthy section consisted of 136 animals, of which none re acted. The tuberculous section at this time consisted of 69 animals. Thus, from dividing the stable into two parts, disinfection, keeping the two halves entirely separate, regularly testing the herd twice a year, feeding the calves from tuberculous mothers immediately after birth on boiled colostrum, and subsequently on boiled milk, the following result was obtained:

Tuberculous animals in *April, 1892;* 131. Healthy animals in *April, 1892;* 77.

Tuberculous animals in *May, 1895;* 69. Healthy animals in *May, 1895;* 136.

SELECTING A BULL FOR DAIRY PURPOSES.

By R. S. Stevenson, Ancaster.

An expression that we often hear among cattle breeders is, that the bull is half the herd. Now in selecting a sire to head a herd, it is necessary that one should be chosen that not only possesses in a marked degree all the characteristics we desire, but he should have the power of reproducing his good qualities, as sometimes we meet with excellent individuals that utterly fail to breed true to type, their blood being impotent to stamp their own good qualities on their offspring. Such animals should be carefully avoided. One of the great disadvantages we labor under as farmers is that we are not sufficiently educated to the advantages of the thoroughbred sire. It is a fixed law of nature that no quality can be transmitted that is not possessed by some ancestor. Surely any intelligent breeder, who wishes to produce certain qualities in the offspring, will see that those qualities are possessed by the parents. The blood of the pure bred sire is so strong that he will always impress himself on his offspring. For instance, if you breed a pure bred Holstein bull with common cows, nineteen out of twenty of his calves will be black and white. That is prepotency. Why does not the common cow have it? Because her heredity is broken up, she cannot impart it. Again, breed a Holstein bull and a Jersey cow, and you will get a very different result. You will have a calf showing the characteristics of both breeds. Now, what is breeding based on? It is based on heredity or pre-potency, which has been established and become a fixed type by long continued breeding for a fixed purpose; and it is certain if we wish to graue up a herd of dairy cows, we must select a bull that has been bred from a dairy breed of cattle, and can show by his pedigree that his dam and his grand dam were good cows. We should then be reasonably sure of his being a good sire himself. The time and money wasted by using

inferior—I might say worthless—sires is incalculable. It is not a difficult matter to select a bull of good individuality, at reasonable cost, from a family that has proved themselves good performers at the pail and churn. The good sire from a good family is almost certain to produce good cows, but he who buys the poor cheap bull will certainly waste his time and feed and fail in his object in the end. The first and most essential quality in a bull is constitution, one that is a good feeder and makes good use of his feed, and one that is large and well developed, as this is an indication of health and vigor. Avoid in-bred bulls as in-breeding has a tendency to weaken the constitution, and surely if any class of cattle require a good constitution it is dairy cattle, from the nature of the demands made upon them. Now in choosing a dairy bull there are certain points by which we can be reasonably sure that he will be a producer of good cows. Every breeder must judge for himself what bull is best suited for his particular herd, but he should be especially good in points where his own cows are lacking. I give the preference to a mature animal, as then his calves can be seen and one can judge what kind of a stock-getter he is. A few of the points I consider as absolutely necessary in a dairy bull are: first, a good skin of medium thickness covered with fine soft silky hair; color of skin yellow; the secretions on the inside of the ears oily and abundant: legs short, straight and wide apart; back level; quarters long; teats well developed; milk veins large; face dishing; rather fine waxy horns; chine should be open and the spinal column loose; wide between the joints.

A bull with these general characteristics, if he has a good pedigree, will almost certainly prove a good sire. Such has been my own experience. I have succeeded in breeding a herd of grade cows that are a great improvement on their own dams.

In conclusion I say to any farmer desirous of improving the capacity of his cows, select the best native cows procurable, breed them to a bull such as I have described, give the heifer calves good care, but don't make them fat, and he will not be disappointed in his heifers when they take their place in the herd.

THE PREVENTION OF PARTURIENT APOPLEXY IN COWS.

By J. Hugo Reed, Professor of Veterinary Science, O.A.C., Guelph.

Parturient apoplexy (commonly, but erroneously, called milk fever) in cows is the cause of serious losses in dairy herds, and frequently in other classes. Pathologists differ as to the nature and causes of the disease, but these are points which we will not now discuss. It is a disease that is peculiar to cows in the parturient state. It appears at variable periods after parturition, usually from three to four hours to as many days, and in some cases much later, and in rare instances during, or even preceding the act. It occurs in cows that are heavy milkers or are in high flesh, or in those which, though low in flesh, have been highly fed for a few days or weeks before calving. It is a disease that does not readily yield to treatment, a large percentage of the cases proving fatal under the most energetic and skilful treatment, especially when occurring shortly after calving. When we are aware of the fatality of the disease and the conditions which favor its occurrence, we can readily understand that preventive measures are much more satisfactory than curative. Prevention consists in reducing the cow's condition as the period of parturition approaches. This is done by limiting the quantity and quality of the food. Not, of course, giving food of poorer quality, but that which is not calculated to increase the flow of milk, and in such quantities as to not increase plethora. If it be during the season when the cattle are on pasture and the grass is plentiful, she should be put in the stable for, say two weeks before calving and fed on a limited supply of dry food. Three or four days before calving she should be given a brisk purgative, say one to two pounds Epsom salt, and immediately after calving the dose should be repeated and the supply of food limited for four or five days longer, when it will be safe to feed so as to cause a large flow of milk. The cow should be kept in comfortable quarters, cold draughts should be avoided, and she should not be allowed cold water to drink

for two or three days after parturition. Opinions differ as to the advisability of milking the animal out thoroughly for a few days, but at all events a sufficient quantity of milk should be drawn to prevent inflammation of the udder, or else the calf should be allowed to suckle the dam. My experience has been that cows treated in this way will not suffer from the disease, but there may be exceptions. However, there is no doubt that even though the disease should occur after such treatment, it will the more readily yield to curative treatment. It certainly is not necessary to subject all cows to the above treatment, as in many cases there is little or no danger of the disease; but in well fed cattle, especially of the milking breeds, after the second calf the danger is imminent. And when we understand the conditions which render certain animals particularly susceptible to an attack, we can readily recognize the wisdom of adopting preventive measures.

STEER AND HEIFER BEEF

By James Wilson and C. F. Curtiss, of Iowa Experiment Station.

Former Experiment Reviewed.

The first investigation of the subject of steer and heifer beef by this station was made in 1893. In that experiment fifteen high grade Shorthorn yearlings were used, five of which were steers, five heifers which were spayed, and five heifers not spayed. These cattle were all purchased from Mr. A. J. Graves, a Shorthorn breeder within a few miles of the college, and were raised alike and sired by the same bull. They were put on feed January 4th, when coming two years old, and fed until the first of the following December, when they were sent to market and sold separately, each lot on its merits They were fed alike and on the same kind of a ration from first to last, but the amount of feed was regulated to conform to the capacity of each lot. Some features of that experiment are presented in the following condensed summary:

	5 Steer	5 Spayed Heifers	5 Open Heifers
Total gain in eleven months	4032 lbs.	3416 lbs.	3288 lbs.
Average gain per day	2.44 lbs.	2.07 lbs.	1 99 lbs.
Cost of gain per pound	5.62 cts	5.86 cts.	6.04 cts.
Selling price on Chicago market	$5.75	$4 75	$4.75
Percentage of dressed beef	63.2	62 8	62.4

Both lots of heifers were placed at a disadvantage by some of their number proving to be in calf,* but while this interfered with their gain and economy of production, they fed out to a finish that was considered, and demonstrated by the block test, to be as good as that of the steers. The market at that time made a sharp discrimination between steer and heifer beef, and the best offer we could get for the heifers was a dollar a hundred less than for the steers. Swift & Co. bought the steers at $5.75 and the heifers at $4.75. The slaughter test showed no material difference in the percentage of dressed beef, but on the block the heifers cut out a greater percentage of high priced meat than the steers. In the value of the meat on the block, a discrimination of one-and-a-half cents a pound on the rib, loin, and plate cuts was again made by Chicago meat dealers against the heifers. The prices for all other products were the same. The application of these prices, however, after allowing the difference of one and-a-half cents per pound as claimed, in value of ribs, loins and plates, showed that the margin of profit to the packers was much greater in the heifers than the steers; and that the actual difference in live weight value of the steers and heifers, instead of being a dollar a hundred, was not more than half that amount. There was also considerable variation of opinion among experts

* Three of the spayed heifers and four of the open heifers dropped calves.

as to the existence of any real difference in value of the steer and heifer meat The English meat dealers whose judgment was obtained testified in favor of the heifer beef, and rated it above that of the steers.

The Second Experiment.

In October of 1894 the station purchased from Joe Adams, of Moweaqua, Illinois, thirteen head of Hereford calves—five steers and eight heifers, with which to repeat the investigation relating to the cost of production and the relative value of steer and heifer beef. These calves ranged from six to seven months of age when purchased in October, and were still in the pasture with their dams where they had been since birth. They were all sired by a pure bred Hereford bull, bred by Tom Ponting of Moweaqua, Illinois, and were out of pure bred and high grade cows. Two heifer calves were purchased from George S. Redhead, of Des Moines, Iowa. These calves were pure bred Herefords, and had also run in the pasture with their dams during the summer.

The thirteen head purchased from Adams arrived at the station grounds October 25th, 1894, and on November 1st five of the heifers were spayed. The weights on this date were—five steers, 2,685 ; five spayed heifers, 2,360 ; and three open heifers, 1,330. All lots were grazed alike on good fall pasture until well into the winter ; and in addition were given a moderate allowance of shelled corn and oats morning and evening. December 1st the steers weighed 3,040, having made an average gain of seventy-one pounds each during the preceding month ; the spayed heifers weighed 2,560, having gained an average of forty pounds each during the month in which they were spayed ; and the open heifers weighed 1,530, showing an average gain of sixty-six-and-two thirds pounds during the same time. These apparently large gains were perhaps in part due to the light weights November 1st, on account of the calves having been recently weaned and shipped. The weights made by the spayed heifers indicate that the operation of spaying is not a serious interruption when done at this age. Spayed heifer No. 417 also dropped an embryo calf on November 10th. On December 19th the two calves purchased from Mr. Redhead were put into the open heifer lot at a weight of 450 and 419 pounds each. The calves were all fed together on cut corn fodder and roots and a moderate grain ration until February 1st, 1895, when the separate feeding began and continued until the cattle went to market on April 1st, 1896.

During the progress of the experiment open heifer No. 420 met with an accident producing permanent lameness and making it necessary to discard her. The record of this lot, therefore, only includes the four that went through. In all our feeding experiments of this nature, every animal is given an ear tag number, and individual weights taken at the end of every period. The record of feed was kept only by lots, but inasmuch as all of the lots prior to the accident were on rather a moderate ration the greater part of the time, and each feed was eaten promptly, it is probable that the individual feed record did not vary greatly.

This experiment covered a period of fourteen months from the time the separate feeding began, and during all but four months of this time the cattle were confined to the feed yards. They were on grass from June 1st to October 1st, 1895, and each lot had equal areas of uniform pasture. The grain was gradually taken off when the cattle were put on grass, and before leaving the pasture at the end of this period the grain ration was gradually restored. While in the feed yards each lot had access to a comfortable, well bedded shed. A portion of the yard was also kept dry and bedded as much of the time as the weather would permit, in order to give comfortable quarters for lying outside. Hay was fed in mangers inside the shed. In time of severe storms, grain was also fed inside the shed, but at all other times the grain was eaten from the troughs in the open yards. Rock salt and a tank of pure water were constantly accessible in the yards.

The following tables present a record of the amount and kinds of feed consumed and gains made by each lot during the period of fourteen months.

COMPLETE FEEDING RECORD.

Five steers.	Hay.	Stover.	Snapped corn.	Corn and cob meal.	Mangels.	Green clover.	Green sweet corn.	Corn fodder.	Cottonseed meal.	Bran.	Gluten meal.	Oats.	Dry matter per head daily.	Dry matter per pound of gain.	Average monthly gain per head.	Average daily gain per head.
February ...1895	519	....	450	90	280	....	.....	887	5	214	355	....	13 66	8 86	43	1.54
March ..... "	515	....	.....	600	310	....	.....	1022	77	310	465	....	15.14	5.80	81	2.60
April ..... "	320	....	....	600	300	....	....	882	75	300	450	....	13.67	6.83	60	2
May ..... "	956	....	45	630	95	425	.....	149	67	315	441	...	14.40	7.55	61	1.98
June ..... "	....	....	.. ...	....	....	....	.....	....	....	...	....	....	....	.....	19	.63
July ..... "	....	....	....	....	....	....	.....	....	....	....	....	....	.....	.....	2	.06
August..... "	....	....	.....	699	....	....	1411	....	....	....	....	....	....	.....	30	1
September .. "	....	...	365	810	....	....	1520	....	....	....	....	....	....	....	48	1.6
October ..... "	585	....	1190	465	....	....	1822	....	127	....	....	....	14.28	5.94	74.5	2.40
November .. "	584	...	1530	120	...	..	†1636	....	271	....	....	....	15.46	12.80	36	1.20
December ... "	620	240	2135	....	365	....	+ 480	....	435	155	....	....	18.84	7.70	76	2.45
January.....1896	546	....	2935	....	702	....	.....	496	527	250	....	....	23.86	8.77	84	2.72
February.... "	506	....	2952	....	725	....	.....	391	508	290	....	95	25.65	12.96	57	2
March ..... "	525	....	1962	542	860	....	.....	560	525	300	....	465	25.08	14.03	55	1.84
Totals	5676	240	13564	4556	3637	425	6869	4327	2617	2134	1711	560	*18.07	*8.70		
Five spayed heifers.																
February....1895	527	....	448	92	280	....	.....	868	5	...	356	....	13.65	8.52	51	1.74
March ..... "	545	...	.....	600	310	....	....	952	77	310	465	....	14.88	5	92	3
April ..... "	220	....	....	600	300	...	....	812	75	300	450	....	13.40	7.91	51	1.70
May .. .... "	955	....	45	630	95	425	.. ...	147	66	315	441	....	13.98	20.2	23	.74
June ..... "	....	....	.....	....	....	....	.....	....	....	....	....	....	.....	.....	53	1.77
July ..... "	....	....	.....	..	....	....	.....	....	....	....	....	....	.....	.....	—4	—13
August..... "	....	....	.....	700	....	....	1420	....	...	...	....	....	....	.....	25	.81
September .. "	....	....	365	810	....	....	1520	....	....	....	....	....	.....	.....	31	1.03
October ..... "	556	....	1190	465	....	....	1807	....	127	....	....	....	14.43	4.36	103	3.31
November .. "	588	..	1530	120	....	....	†1647	...	271	....	....	....	15.49	11.45	41	1.35
December ... "	620	230	2135	....	365	....	+ 375	....	435	155	....	....	18.66	10.26	56	1.82
January.....1896	544	....	2794	....	710	....	.....	441	523	262	....	....	23.01	8.96	79.6	2.57
February.... "	504	....	2705	....	725	....	.....	351	508	290	....	95	24.64	11.52	62	2.14
March ..... "	525	....	1401	542	860	...	.....	450	525	300	....	465	22.19	11.90	58	1.93
Totals.....	5684	230	12613	4559	3645	425	6769	4021	2612	1932	1712	560	*17 53	*8.60		
Four open heifers.																
February. ..1895	422	....	359	74	224	...	....	692	4	171	285	....	13.64	5.09	75	2.69
March ..... "	450	....	.....	469	242	....	.....	759	61	248	362	....	14.13	7.01	62	2.01
April ..... "	256	....	....	480	240	..	.....	664	60	240	360	....	13.65	7.31	56	1.87
May ..... "	766	...	36	504	76	340	....	118	53	252	353	....	13 99	11.55	40	1.29
June ..... "	....	....	.....	....	....	....	.....	....	....	....	....	...	.....	.....	55	1.83
July ..... "	....	..	.....	....	....	....	.....	....	....	....	....	....	.....	.....	—10	—32
August ..... "	....	...	...	560	..	....	1136	....	....	....	....	....	.....	....	28	.92
September . "	...	....	292	648	....	....	1216	....	....	....	....	...	...	.....	34	1.13
October ..... "	456	....	952	372	..	....	1442	....	102	...	....	....	14 50	4.47	101	3.24
November .. "	466	....	1221	96	...	....	†1329	....	215	....	....	....	15.46	8 70	53	1.79
December... "	496	117	1688	....	298	....	+ 412	...	348	124	....	....	18.41	13.43	42	1.37
January 1896	423	....	2156	....	572	....	.....	349	424	197	....	...	22 40	6.64	103	3.34
February.... "	387	....	2071	.	580	....	.....	298	406	232	....	76	23.45	6.71	90	3.10
March ..... "	405	....	1253	434	688	...	.....	330	420	240	....	372	22.75	11.51	61	2.04
Totals	4527	117	10031	3637	2920	340	5525	3210	2093	1704	1360	448	*17.34	*7.67		

* Averages. † Sweet corn fodder.

AVERAGES OF FIVE STEERS.

Average gain per head daily, for entire period	1.71 lbs.
" " " for ten months not on grass	2.07 "
" dry matter per pound of gain for ten months not on grass	8 70 "
" cost of feed per pound of gain for ten months not on grass	3.90 cts.
" cost of feed per pound of gain for entire period	4.08 "

AVERAGES OF SPAYED HEIFERS.

Average gain per head daily, for entire period	1.70 lbs.
" " " for ten months not on grass	2 03 "
" dry matter per pound of gain for ten months not on grass	8.60 "
" cost of feed per pound of gain for ten months not on grass	3 88 cts.
" cost of feed per pound of gain for entire period	4.05 "

AVERAGES OF FOUR OPEN HEIFERS.

Average gain per head daily, for entire period	1.86 lbs.
" " " for ten months not on grass	2.26 "
" dry matter per pound of gain for ten months not on grass	7.67 "
" cost of feed per pound of gain for ten months not on grass	3.47 cts.
" cost of feed per pound of gain for entire period	3.65 "

In the foregoing computation the feeds used prior to the grazing period were rated at the following prices based upon local market values prevailing at that time :

Gluten meal,	per cwt	70 cents.
Snapped corn,	"	56 "
Hay,	"	30 "
Corn fodder,	"	20 "
Corn and cob meal,	"	75 "
Bran,	"	70 "
Ear corn,	"	65 "
Mangels,	"	5 "
Green clover,	"	2.5 "

During the grazing period the pasture was charged at the rate of one dollar per head each month, and in the last period, the feeds used were rated at the following prices :

Green sweet corn,	per cwt	2.5 cents.
Snapped corn,	"	20 "
Oats,	"	40 "
Hay,	"	28 "
Corn stover,	"	10 "
Corn and cob meal,	"	30 "
Cotton seed meal,	"	85 "
Bran,	"	40 "
Mangels,	"	5 "

These prices represent a wide range in values of the principal feeding stuffs, but the variation is due to the transition from a year of very severe drouth (1894) and consequent shortage of grain crops, to one of great abundance of all farm feeds.

The illustrations appearing on the following pages represent the cattle at the close of the feeding experiment. These are very faithful likenesses of all animals of each lot, and indicate the superiority of form and finish demonstrated by the record made in the slaughter and block test reported in another place.

The individuals in each lot were selected with a view to uniform excellence and good feeding quality, and each class was well represented. As before stated, all of these cattle were by the same sire and from a uniform herd of cows, except the two that were purchased from Mr. Redhead. These are shown in rear of the open heifer group. One of them was perhaps the best animal in this lot and the other was considered the poorest, though there was no great variation in any of them and these two averaged about the same as the others.

It will be seen by reference to the feeding record that the open heifer lot made the best returns in the feed yard, the gains being not only the largest but also from the least feed. The steers ranked next to the open heifers, and the spayed heifers made practically the same gains at about the same cost.

In the former investigation of this subject by the station in 1893 and '94, the steers made both larger and cheaper gains than either lot of heifers This result was doubtless in part due to the disadvantage of several representatives of the heifer lot proving to be in calf, though the individual record of each animal showed that the heifers that were free from calf also failed to make as good average gains as the steers.

It should also be noted that two heifers in the latter experiment dropped calves. Mention has already been made of spayed heifer No. 417 dropping a calf in November 1894. This was soon after the operation of spaying and caused little if any interruption, as she made a gain of 45 pounds in the month of November. This heifer is shown in the center of the spayed heifer group. Open heifer No. 418 shown at the left of the illustration of the open heifer group also gave evidence of being in calf soon after the feeding test began, and Dr Niles, of the veterinary department, gave treatment causing her to abort March 4th. This interruption prevented any gain by this heifer in the month of March. Her weight on March 1st was 780 pounds, and on April 1st it was the same. In the following month, however, her gain was seventy pounds, the largest made by any heifer in the lot during that month. It is unusual for heifers of this age to get with calf, and it was thought that in starting with animals under one year of age, the danger of that kind of interruption would be avoided, but in this case it is evident that the heifers became pregnant when not over six or seven months old, while yet with their dams and other cattle in the pasture.

The object of this experiment was to compare the feeding value of heifers with that of steers under like conditions, and to get indications of the effect of spaying on one-half of the heifers. A comparison shows that in this case, spaying was not beneficial, as the open heifers made a gain of 2.26 pounds per head daily for the ten months of yard feeding, the time when we could control the actual amount of nutrients each lot consumed. The spayed heifers gained 2.03 pounds per head daily during the same time. Individuality may have operated, but as careful a division as could be was made before spaying. We can go to the length of saying that we have found no advantage to the spayed lot from the operation in this experiment. Spaying does not suppress Nature altogether, the spayed heifers did not come in heat as regularly as the open heifers, but they did come in heat occasionally during the earlier months of feeding and it may be added that as the fattening process went on, evidences of being in heat diminished with both lots until toward the close of the feeding period, it ceased entirely. It is well settled that fattening is antagonistic to fecundity. The steers gained 2.07 pounds per head daily during the ten months of yard feeding, which is slightly less than the average gain of both lots of heifers.

The open heifers made their gain in live weight from 7.67 pounds of dry matter for a pound of gain; that is, from nutrients estimated after the organic moisture was deducted. The spayed heifers made their gain on 8 60 pounds of dry matter for a pound of added weight; while the steers required 8.70 pounds of dry matter to gain a pound in weight. This controlled the cost of the gains made which for the open heifers was 3.47 cents; for the spayed heifers, 3 88; and for the steers, 3.90. The heifer commends herself to the feeder in comparison with the steer. In this experiment she made gains on less feed and at less expense.

THE STEERS.

The average daily gains for the entire period are less than those for the ten months of yard feeding. The table shows that gains were decidedly less during the four months of pasturing, and the cost of gain was also greater. This is contrary to the results of former experiments at this station, with one exception, and that was a bunch of cattle reported in Bulletin 32, and grazed under similar conditions to these. When these cattle went to grass they had been on good rations for four months, in fact, on fattening rations for animals of their age and weight, although they were not fed heavily. Very excellent pasture conditions are required to keep up a two pound a day gain on as young animals as they were. We did not have such conditions. It is an open question how fat an animal should be to make best gains on different pastures.

Bulletin 20 of this station (page 688), shows grazing results from eighteen steers on clover pasture; one-half of them getting corn meal gained 2.32 pounds per head daily; the other half of them on oil meal gained 2.03 pounds per head daily. The cattle in that experiment were a year older than the steers and heifers under consideration. The cattle reported in Bulletin 20 were on clover; the steers and heifers in this experiment were on timothy and blue grass pasture. The former had grain regularly while on pasture, the latter had grain only during the last two months. Gains made on grass throughout the west are generally on cattle in lean condition in spring, or on cattle half fat when grazing begins, to which corn is regularly fed. The cattle in this experiment made about half the gains on grass that they did in the yards; the cattle in Bulletin 20, on the finest conditions possible, with liberal amounts of corn meal to one-half of them and oil meal to the other half, did not make as good gains as they did in the yards. We have yet to learn of grazing cattle making as good gains as stall or yard fed cattle, although, as before stated, the gains produced on pasture are almost invariably made at less expense than by yard or stall feeding.

During the preceding summer, 1894, the station had twenty head of two year old feeding steers on this same pasture for three months. Ten head of these cattle had a daily allowance of ten pounds of corn and cob meal per head, and made an average daily gain of 2.13 pounds per day, and ten head made an average daily gain of 2 01 pounds per head from grass alone. This was in the season of excessive drouth, when the rainfall at this place during the summer grazing months was less than one-half that of 1895 Those results are reported in Bulletin 28 of this station. The cattle in this experiment were a year younger than both of the other bunches to which we have referred. To what extent the age may have influenced the results is not known.

The gain of January on all lots deserves notice. The steers reached 2 27 pounds, the highest monthly gain; the open heifers reached 3.34 pounds, being the highest; and the sprayed heifers gained 2.57 pounds, exceeded only in the month of October, during which month all the lots made heavy gains that may, perhaps, be partially attributed to the change from pasture to feed yard conditions, and an increase of stomach contents. The January gains were made on an increase of dry matter, but the increase had been gradual from a fraction over fourteen pounds a day to each lot in October, to twenty-three in January, culminating in 25.65 for the steers, 23.45 for the open heifers, and 24 64 for the spayed heifers in February, after which it was reduced in each case, although only very little for the steers. These were the months when the greatest gains were made. Both lots of heifers exceeded the steers in gain during the last six months, from October to March, and the heifers made greater gains than the steers on less feed during the last three months.

The increase in feed for January was considerable, both in snapped corn and cotton-seed meal, but the nutritive ratio was not changed radically. There was an increase in the mangels that perhaps had an influence on the digestion of the animals. Bulletin 32, page 434, calls attention to the value of roots in feeding dairy cows. Wolff, a German experimenter, finds that the digestibility of crude protein of coarse fodders is decreased when the dry matter of roots or potatoes is fed heavily, equal to a sixth or a half of the

SPAYED HEIFERS.

entire ratio. We have never feed roots so heavily. The dry matter of the mangels fed in this experiment being only at most about two per cent. of the entire rations.

We are aware that extensive root feeding is not practical in Iowa in beef making, but the farmer feeding a few finely bred steers, raised on his farm, designed to sell in the extra steer class, may find it profitable during winter to provide a few pounds of mangels daily to aid digestion. There is a point beyond which added feed is not profitable. The January ration was not as heavy as that fed in February to any of the lots. yet the January gain was greatest. No rule can be laid down regarding the amounts of feed that will be most profitable; the feeder must be the judge, and the appetites of the animals will be the best indication.

From the time these cattle were brought from the pasture to the feeding yards, October 1st to April 1st, they were on full feed, and had all they would eat up promptly with a good, keen appetite for each feed. Heavier gains have been made in some of the former experiments at this station than those recorded here, but on larger cattle and at a greater ratio of feed per pound of gain. The rate of increase in this experiment is one pound of gain in live weight for each eight and one-third pounds of dry matter in the feed consummed, while, as stated, on page 536 of this bulletin, the average amount of dry matter per pound of gain in cattle is over ten pounds. Large cattle will produce heavier daily gains, but they are usually produced at greater cost.

Cottonseed meal was fed liberally to these cattle from October to April, as will be noted by referring to the feeding record. It was also fed moderately during the first winter. The results from the use of this feed for fattening cattle at the Iowa station have been very satisfactory in all respects. Toward the close when the cattle were being crowded to their full capacity, we fed liberally of roots and also added some oats to the ration. Both of these feeds were highly relished, and they were used mainly to induce the animals to eat and digest as heavy a ration as possible. We place a high estimate upon the value of roots for this purpose. All the cattle marketed by this station since 1892 have been fattened and finished on corn, supplemented toward the end with some nitrogenous product, and roots. This contributes to the high finish, in conjunction with large gains and smooth even flesh of superior quality, that has characterized the station cattle. Five shipments of cattle from the station since 1892 have topped the market in every case but one, and in some cases by as much as fifty cents per hundred. The percentage of dressed beef and the record made on the block by this and other shipments have, we believe, never been equalled by a car load lot. We call attention to these results for the purpose of emphasizing the value of good methods in feeding well bred animals.

The three lots of cattle were prepared for shipment by withholding the water and evening grain feed on March 31st, and giving a double allowance of hay. On the morning of April 1st, each lot was given twelve pounds of snapped corn per head, but no water. At ten o'clock a.m. they were weighed and loaded in a Chicago & Northwestern car side tracked at the station yards. The car was deeply bedded with straw, and had racks filled with hay.

The average weights taken at home just before loading, were as follows: Steers, 1388; sprayed heifers, 1,300; and open heifers, 1,337. The selling weights in Chicago, April 2nd, were: Steers, 1,346; sprayed heifers, 1,264; open heifers, 1,285. These are heavier shrinkages than our cattle usually sustain in going to Chicago, but much of it is probably due to the day in the yards being so cold and disagreeable as to prevent a good fill. The total shrink from the final weights on full feed and water at our yards was fifty pounds on the steers, fifty-three pounds on the spayed heifers, and fifty-nine pounds on the open heifers. The cattle were purchased by Swift & Co, at $4.50 per hundred for the steers, and $4 25 for the heifers, both lots being rated alike. The highest price paid for any other cattle on the market that day was $4 40 for steers. They were sold in the open market Thursday, April 2nd, in competition with 5,500 head of other cattle.

OPEN HEIFERS.

RECORD OF THE SLAUGHTER TEST

Five Steers.		Weights.	Percentages.	Five Spayed Heifers.		Weights.	Percentages.	Four Open Heifers.		Weights.	Percentages.
	Beef	4438	67.05		Beef	4172	67.47		Beef	3445	68 59
	Hides	437	6.61		Hides	368.50	5.96		Hides	326	6.49
	Blood	222	3.35		Blood	192.50	3.11		Blood	149.50	2.97
	Heads	146.50	2.21		Heads	117 75	1.74		Heads	95.50	1 90
	Tongues	43	.65		Tongues	39 50	.64		Tongues	30	59
	Tongue trimmings	1	.01		Tongue trimmings	.75	.01		Tongue trimmings	.50	.01
	Feet	90	1.36		Feet	69.50	1 23		Feet	58	1.15
	Caul fat	126	1.91		Caul fat	122	1.97		Caul fat	89	1 77
	Brisket fat	12.50	.19		Frisket fat	14	.22		Bri-ket fat	10.75	.22
	Bed tallow	39.50	59		Bed tallow	40	.65		Bed tallow	29	.57
Pauches and contents 539 lbs.	Pauches empty	159	2.40	Paunches & contents 557 lbs	Paurches empty	162	2.62	Paurches & contents 398 lbs	Paunches empty	205	4.08
	" waste	282	4.26		" fat	112	1.81		" waste	126	2 52
	" fat	98	1.49		" waste	283	4 58		" fat	67	1.33
Intestines & contents 352 lbs	Intestines empty	92.50	1.39	Intestines & contents 331 lbs	Intestines empty	95.50	1.54	Intestines & contents 263.5 lbs	Intestines empty	73	1.45
	" waste	59.50	.89		" waste	54	.87		" waste	45.50	.92
	" fat	200	3 02		" fat	181	2.92		" fat	145	2.88
Plucks 173.5 lbs.	Livers	70	1.06	Plucks 159 lbs	Livers	65	1.15	Plucks 128 lbs	Livers	55	1.09
	Hearts	15	.23		Hearts	15	.24		Hearts	12	.24
	Lungs and windpipes	60.50	.91		Lungs and windpipes	49	.79		Lungs and windpipes	41	.81
	Heart fat	3	.04		Heart fat	5	.08		Heart fat	3	.08
	Pluck fat	25	.38		Pluck fat	25	.40		Pluck fat	17	.34
		6620	100			6183	100			5023	100

Rib and Loin Cuts from Steers.

Rib and Loin Cuts from Spayed Heifers.

Rib and Loin Cuts from Open Heifers.

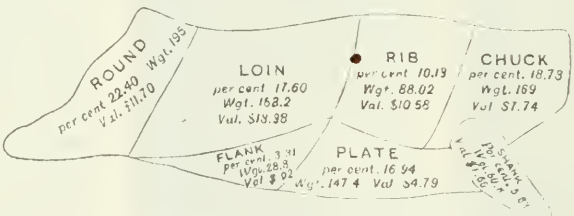
The *Breeders' Gazette* of current issue, said :

"Some buyers were disposed to consider them about as fat a bunch as has been seen in the yards in years. They were also pronounced about as good a bunch as had crossed the scales in a long time. * * * They were prime cattle, including some that would have ranked high at the fat stock show, and the bunch averaged a dress of 67.7 per cent."

The cattle were killed by Swift & Co., and subjected to a careful detailed test on the following day, April 3rd.

It will be seen that both lots of heifers dressed out a higher percentage of beef than the steers. Aside from this no material difference is revealed in the slaughter test. The weights and percentages of head and feet of heifers indicate a slightly finer bone and correspondingly less waste in these parts. It is commonly held that heifers run more to fat, on the block, than steers. The records of this test indicate but very slight variation in the internal fat, and when any difference is apparent the steers generally present the larger amounts. The distinctions brought out by the slaughter test in this experiment, though comparatively small, are in favor of the heifers, and to that extent the heifer carcasses were the most profitable to the butcher.

The following diagram represents Swift & Co.'s method of cutting beef.



*The weights, percentages, and values given here are the average per head for the lot of five steers.

The records made on the block are presented in the preceding illustrations and table. The illustrations are the reproductions of photographs of the rib and loin cuts from each lot. The rib cuts are shown on the left and the loin on the right. The position of these cuts is reversed in the upper layer, thus giving a view to each end.

THE FUNDAMENTAL POINTS OF PRACTICAL EXCELLENCE IN BEEF CATTLE.

By C. F. Curtiss, Director and Professor of Agriculture, State Agricultural College and Experimental Station, Ames, Iowa.

A brief consideration of the qualities of practical excellence in beef cattle may well engage the attention of the breeder and feeder. A topic of this character is too often regarded as of interest only to the professional exhibitor, or the lecture room instructor and student ; but in this field every successful breeder must always be a student, for the first essential in successful breeding is a clear conception in the mind of the breeder of what constitutes a good animal, and of all the characteristics that go to make up real excellence in a herd or flock. It is said that the late renowned Amos Cruickshank, the founder of the great Scotch tribe of shorthorns, was often seen by the side of the leading sale rings of Great Britain, intently studying every animal that came into the ring, and his minute knowledge of all the animals brought out was the marvel of those who chanced to converse with him about them afterwards.

And while the methods of the first great improver of live stock were largely secret, it is known that the justly celebrated Robert Bakewell was not only an exceedingly close

student of living forms, but that his rooms were also full of models and parts of domestic animals that he had carefully dissected and studied piece by piece, and preserved in alcohol for future reference. In his work of selection and improvement he imparted to the Leicester sheep such a remarkable aptitude to take on flesh that this quality remains a characteristic of the breed to a greater degree than any other long-wooled breed of England even to the present day.

I invite your attention to this subject on account of its general importance to the beef producer as well as the breeder of show ring and sale stock; for I contend that the show ring type must necessarily keep close to, and be largely governed by, the practical demands imposed by the feed yard and the block; or else the lessons of the show yard and sale ring are without value, if not positively misleading. No one is more concerned in what constitutes the essential qualities of a good beef animal than the man who breeds and feeds for the block; for it must be kept in mind that this is the ultimate end of all beef stock, and the best beef animal is the one that carries to the block the highest excellence and the most profit. This, in a word, is the keynote of the whole problem, and if we do nothing more than look squarely at this subject in the right light we will have made a good beginning. It means everything in the live stock business, to begin right, to be travelling upward—to just be headed in the right way. To be headed the opposite way is fatal.

To begin with, there is a well defined beef type that admits of less flexibility than is generally regarded. We hear much about the dairy type, and there is a dairy type, fairly clean cut and well defined; but I want to say to you that there is also a beef type, more rigid and less variable than the dairy type. Your own observations and experience will bear me out in this assertion. You all know that there are not a few cows of quite positive beef tendencies capable of making very creditable dairy records, and a great many that combine milk and beef to a profitable degree; but can you recall an instance of a good carcass of beef ever coming from a steer of a pronounced dairy type or breed? So clearly and definitely is this beef type established that to depart from it means to sacrifice beef excellence.

Here are some illustrations that pretty accurately represent the ideal beef type. The first illustration is a good reproduction from a photograph of a prize-winning Angus heifer exhibited by Queen Victoria at one of the late Smithfield fat stock shows. The next illustration is a portrait of a high-grade Shorthorn steer, raised as a skim-milk calf at the Iowa Experiment Station. He was the best steer in the Chicago yard on a day when there were 26,000 cattle on the market. The third illustration is of a high-grade Hereford steer, fed at the Iowa Experiment Station, that was good enough to easily top the market, and was one of five to dress an average of 67.05 per cent. of net beef. He weighed, when two years old, 1,620 pounds. I have also here a standard of excellence that I have formulated for the use of students in judging beef cattle:

Polled Angus Heifer.

Champion at Smithfield Fat Stock Show. Owned by Her Majesty Queen Victoria.

Scale of Points of Excellence in Beef Cattle, as used by the Students in the Department of Agriculture in the Iowa Agricultural College.

	Possible score.
(a) *General Appearance*: 25.	
Weight—estimated..... lbs.; actual	
Form, smooth, even, parallel lines, deep, broad, low set	10
Quality, thick covering of firm flesh; mellow touch; soft, heavy coat; fine bone; velvet-like skin	10

	Possible score.
Style, vigorous, strong character, active, but not restless	5
Objections, rough or angular in form, harsh coat, hard skin, dull appearance.	
(*b*) *Head and Neck*: 10.	
Muzzle, broad; mouth, large; jaws strong; nostrils large	2
Eyes, large, clear, placid	2
Face, short; quiet expression	1
Forehead, broad, full	1
Ears, medium size, fine texture	2
Neck, thick, short and full; throat clean	2
Horns, fine texture, medium size or small	
Objections, long or lean head and neck, dull eyes, coarse, heavy horns	
(*c*) *Forequarters*: 10.	
Shoulders, covered with flesh, compact on top, smooth	4
Brisket, prominent and wide	3
Dewlap, full skin, not too loose and drooping	1
Legs, straight, short; arm full, shank fine, smooth	2
Objections, bare shoulders, narrow on top, contracted brisket, coarse legs	
(*d*) *Body*: 35.	
Chest, full, deep, wide; girth large; crops full	8
Ribs, long, arched, well covered with firm flesh	7
Back, broad, straight, smooth and even	10
Loin, thick, broad, full	6
Flank, full, even with underline, or nearly so	4
Objections, narrow or sunken chest, hollow crops, sloping ribs, bare or rough back and loin, high flank	
(*e*) *Hindquarters*: 20.	
Hips, wide, smooth, well covered	5
Rump, long, even, wide, smooth, not patchy	4
Pin bones, wide apart, smooth, not patchy	2
Thighs, full, deep and wide	2
Twist, full, deep, large, level with flank, or nearly so	3
Purse, full, indicating fleshiness	2
Legs, straight, short, shank fine, smooth	
Objections, prominent rough hips, narrow, bare rump, spare thighs, light twist, small purse, coarse legs	
Total	100

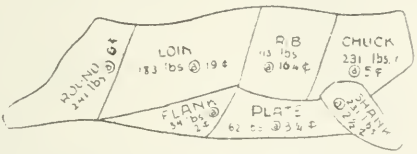
NOTE.—In practice the student sets down opposite each section the value of the points deficient, also of the objections, and subtracts the total from 100, which will give the estimated score.

I regard the score card as an educator and of great advantage to the student, but I do not favor its use in the show ring. The judge who goes into the show ring should carry a clean cut mental conception of a good animal, and the qualities that are objectionable. This applied to the animals of a ring virtually amounts to the use of a score card without the objectionable features of that system. In recommending the score card to the student, I use the term student in its broadest sense, embracing not only the prospective breeder within the class room, but also every member of the great practical school of every day working breeders, who wishes to keep in the foremost rank of the profession. One of the prime causes why so many men fail in this field is the lack of a thorough study of the essential characteristics. In other words, and to put it more plainly, breeders fail to breed good animals because they do not know what good animals are.

I will only endeavor to call your attention at this time to some of the more important characteristics enumerated in the score card, as my time will not permit me to take up this subject in detail.

The first thing that should be looked to is the general beef form—low, broad, deep, smooth and even, with parallel lines. No wedge shape is wanted for the block.

Next in importance is a thick even covering of the right kind of meat in the parts that give the high priced cuts. This is a very important factor in beef cattle that is often overlooked. Here is a drawing representing the wholesale method of cutting beef, showing that about twenty-eight per cent. of a good carcass of beef sells for nearly sixty-four per cent. of the total value. The high priced cuts are the ribs and loins. These parts on an average sell for about three times as much per pound as the others. Good broad, well covered backs and ribs are absolutely necessary to a good carcass of beef and no other excellencies, however great, will compensate for the lack of this essential.



It is necessary to both breed and feed for thickness in these parts. And mere thickness and substance here is not all. Animals that are soft and patchy, or hard and rolled on the back, are sure to give defective and objectionable carcasses, even though they are thick, and they also cut up with correspondingly greater waste. The men who buy our cattle and fix their market value, are shrewd enough to know almost at a glance how much and just what kind of a meat a steer or a carload of steers, will cut out, and if the producer overlook any of these assential points, he is compelled to bear the loss.

Then, in addition to securing the general beef form and make up, together with good backs, ribs and loins, there is a certain quality, character, style and finish that constitute an important factor in determining the value of beef cattle. One of the first indications of this is to be found in the skin and coat. A good feeding animal should have a soft mellow touch, and a fine but thick and heavy coat. A harsh unyielding skin is an indication of a sluggish circulation and low digestive powers. The character and finish

HIGH-GRADE SHORTHORN STEER.

Raised as a skim-milk calf by the Iowa Experiment Station. Best steer in the Chicago yards, on a day when there were 26,000 cattle on the market.

HIGH-GRADE HEREFORD STEER.

Fed and marketed by the Iowa Experiment Station. Weight at two years old 1,620 lbs. Sold at ten cents above the topmost price for other cattle on the market.

exemplified by a clear, prominent, yet placid eye, clean cut features, fine horn and clean firm bone, all go to indicate good feeding quality and a capacity to take on a finish of the highest excellence, and consequently to command top prices. I would not tolerate too large or too coarse bone. Coarse boned, rough animals are almost invariably slow feeders and hard to finish properly. A certain amount of size is necessary, but it should be obtained without coarseness. The present demand exacts quality and finish rather than size.

Besides these qualities, and above all, it is necessary to have vigor and constitution. We find evidence of these in a wide forehead, a prominent brisket, broad chest, full heart girth and general robust appearance; and without them other excellence will not have its highest significance.

Every Live Stock Exhibition Should Have its Fat Stock Classes.

And now, while I have urged the importance of those things which go to make up a finished carcass of beef of the highest value, and while, as I have stated, the block is the ultimate end of all beef cattle, I want also to state that undeveloped breeding stock cannot at all times be expected to measure up to this standard. And right here I want to say a word about our present system of show-yard competition. I believe that every fair and live stock exhibition should have its fat stock classes, and that these should be taken as the standard of the finished product. They will afford the most practical and useful lessons to be gained by the show, and the stock brought out for them will represent the culmination of the highest excellence that can be attained. The competition will be a measure of everything at its best, and in it every animal will rightly be rated according to what it is capable of producing on the block. The show ring should afford a contest of that kind, and in addition to the practical lessons, and its educational value, it would partially remedy the tendency to rate breeding stock according to the flesh carried. While heavy flesh is necessarily a factor of great importance, yet to go into a breeding herd and absolutely rate every animal as if it were to go at once to the shambles may lead to entirely erroneous results. I do not undervalue fitting; other things being equal, the best fitted should always win, but the point that I want to urge is that an animal in a breeding herd ought to be rated according to its value as a representative of that herd, and for the purpose of the herd, instead of taking rank simply as a carcass of beef in the form presented. In a fat stock ring it is proper that only the carcass be considered. In a breeding ring, an animal should be rated by its value to go on in the herd, and not simply to go on to the block. There is a well marked distinction here that should never be overlooked. The fat stock classes should be added for the lessons that that they will bring, and to avoid diverting the purpose of the breeding stock classes. A sum of money equal to that given to any one breed would be sufficient to make a satisfactory classification in which fat stock of all beef breeds could compete and furnish one of the most interesting and instructive features of the fair.

In conclusion, I wish to call attention to one other point, by way of emphasis, of the necessity of having the right kind of cattle to insure a profit, or rather to avoid a loss, under present conditions There is not a very great difference in the rate of gain, or the number of pounds of increase in weight, from a given amount of feed, that will be made by a representative of the best beef breeds and a genuine strub, a Jersey or a Holstein steer. This is a fact that practical breeders and improvers of live stock were slow to accept at first. In fact they did not accept it until it was repeatedly demonstrated, and some will not concede it yet, but the evidence is constantly accumulating and it is useless to ignore facts. After all there is no well founded reason why a Shorthorn or a Hereford or an Angus should make more gain in weight from a bushel of corn than a Holstein, a native or a scrub. This is governed altogether by the digestive and assimilative machinery of the steer. The Holsteins, for instance, are known to be vigorous eaters, and the despised scrub usually has a digestive system like a goat—and is always hungry. Scientists have discovered that civilized man has no greater powers of digestion than the barbarian or the Indian. Neither has the improved steer better digestion than the native.

High-Grade Jersey Steer.

Fed and marketed by the Iowa Experiment Station. Realized only $2.12½ below top quotation.

The feeder is often deceived in the belief that he has a good bunch of cattle simply because they feed well and gain rapidly. Economy of production is an important factor, but it is by no means all. It is even more important to have a finished product that the market wants and will pay for, than that it simply be produced cheaply.

I have here, for example, illustrations of two steers fed at the Iowa Experiment Station; one is a Jersey and the other a Hereford. (See third and fourth illustrations in this article.) While they were in the feed lot, the Jersey made a gain of two pounds a day for nine months; and the Hereford 2.03 pounds for fourteen months. There was practically no difference in the rate and cost of gain. Judged by the record they made up to the time they went to market, the Jersey would take rank close to the Hereford in both rate and economy of gain. But the interesting part of the comparison came later. The Jersey took on flesh rapidly, and was exceedingly fat and well finished. He was as good as it is possible to make a Jersey steer. Yet when he went to market he had to sell $2.12\frac{1}{2}$ below the top quotations, while the Hereford went ten cents above the top for any other cattle on the market. But you may say that this was partly prejudice. I used to think so, but since I have followed cattle through the feed lot and to market and onto the block, and carefully ascertaining all the facts for several years, I have changed my mind. I will show you where the difference was in those two steers. This steer (the Jersey) belongs to a breed that has been developed for centuries for the specific purpose of making butter—that is, putting the product of its feed into the milk pail. They are rough, angular, and bony, and when you fatten them, as you can do, they do not put the fat into the tissues of the high-priced cuts of steaks and roasts on their back, but this steer had 190 pounds of what is termed loose or internal tallow, 55 pounds of suet on a 763-pound carcass; that is 32.1 per cent. of that steer's carcass was tallow. Tallow was at that time worth four cents a pound, while the best loin cuts were worth nineteen cents, at wholesale. And besides that this steer only dressed 57.5 per cent. of beef, while the Hereford dressed 67 5 per cent. Then the Hereford only had 95 pounds of tallow and 38 pounds of suet on 888-pound carcass—equivalent to fifteen per cent. And besides this striking difference in percentage of meat in high-priced cuts, the meat of the Jersey was very much inferior to that of the Hereford. The Jersey steer went on accumulating fat around his paunch and internal organs to the extent of nearly one-third of his body weight, while he hadn't meat enough on his back to decently cover his bones. This explains why you can never get a Jersey or a Holstein or any other roughly-made steer smooth, no matter how long you fatten them. Thus you see there is a reason why rough cattle do not sell. These same distinctions are largely true of the native and all other improved cattle, when an attempt is made to fatten them for beef. The men who buy them don't need to kill them to find it out; they know it as soon as they see them.

So when we put a steer into the feed lot to fatten, it is all right to know that he is gaining rapidly and cheaply, but we also want to know whether he is making a four cent product or a nineteen cent product. If he hasn't the beef type, and hasn't the characteristics of a beef animal bred into him, he will fall short of the mark. Feed alone does not make the high-selling product.

BEEF PRODUCTION.

By Mungo McNabb, Cowal.

While grass grows and water runs the human race will require for its sustenance an ever increasing supply of beef. The population of the world is constantly enlarging; new towns and cities are springing up, especially in the western world; people in comfortable circumstances are growing more numerous every year; and we may therefore reasonably expect that there will be an ever-increasing demand for the product of the farm. The demand will be no doubt for a better quality of beef as it now is for a better quality of butter, and as those who make the demand will be willing to pay a better price for what suits their taste than they would be willing to pay for what does not suit them it will be wisdom on the part of the farmer and stock raiser to try to cater to the tastes

of his customer and to try to meet the demands which his market makes upon him. Great Britain's market has in the past fifteen years been a grand opening for disposing of the well fed beef of this country, and the trade we have had with that country in beef and beef cattle has undoubtedly brought large sums of money to us. That market is still open to us and free to our beef, if not to our beef cattle, and there is every probability that it will continue open and free to us. So that while we have not now, and very likely never will have, the advantage over other beef producing countries which we once had of being permitted to take our cattle inland alive, we shall still have the British market open to us on equal terms with other countries, and if proper care and attention is given by our breeders and feeders to producing the very best quality of beef and placing it upon the market in the very best possible condition, there is no doubt that we shall obtain the highest prices that are going The whole difference between profit and loss in a critical market generally lies in the difference that there is in the quality and condition of the animals offered for sale when put upon the market. Animals of the best quality will always find buyers at a fair price even in a depressed market, while animals of inferior quality and condition will be passed by and neglected even in a buoyant market, and will in a depressed market, have to go begging for buyers altogether. The breeders of the country are responsible for the class of cattle the country produces, and they should exercise care and discretion in keeping up the standard of the product as far as their influence extends. It is a matter of regret that many farmers are so slow to avail themselves of the use of pure bred sires. Many still prefer to use a nondescript scrub at fifty cents than to avail themselves of the services of a pure bred bull at $2; but we must deal with these matters as we find them and the only way to bring about an improved state of affairs is by doing what we can to promote a general system of education in these matters, line upon line, and precept upon precept, until there is an improvement over the whole country.

Observation and experience join to confirm the principle that in order to produce beef successfully we must breed only the special beef herds. Of those special breeds we certainly have a choice, Durhams, Herefords, Polled Angus and Galloways existing in sufficient numbers in this country to afford plenty of room for the exercise of our individual preference, whatever that may be. Of the breeds that I have mentioned the Durhams or Shorthorns have with most farmers the preference, and certainly as beef producers if they have an equal they have no superior. They possess in a remarkable degree those qualities that are essential to successful beef production—constitutional vigor, size, early maturity and the aptitude to lay on flesh rapidly either in the stall or pasture.

In breeding for beef it is necessary to have: First, roomy and comfortable stables sufficiently warm to prevent the manure from freezing, and, second, a plentiful supply of water available so that the cattle can procure it easily whenever it is required. The dam of the calf should be selected with care, but nevertheless she need not be pure bred. The common Canadian cows are in many cases good enough to produce good steers, and if the farmer possesses these it is not necessary to part with them. Breed these cows to a first-class pure bred sire, and the first cross will produce a steer that with care and management will be fit for export at from two and a half to three years old; and by breeding the heifers obtained from these crosses to pure bred sires you will soon have a herd of cows that for the production of steers are in every respect equal to pure breds. It has been found in practice that the first conception has an influence on all subsequent ones; therefore be particular to breed all heifers to nothing but the best pure bred sires. The two essential qualities that every cow should possess are: first, constitutioual vigor, and second, roominess. She should also have good size and good bone, but the bone should not be strong enough to be coarse. She should have a large mouth and large wide open nostrils; mild expressive eyes, with a good width between, and fine well-shaped horns; a thin neck, a straight broad back, with well sprung ribs; long quarters and a fine tail. Her skin should be loose and velvety to the touch, and covered with an abundance of fine mossy hair. Her udder should be large and well placed, and extend well forward and upward. The bull should invariably be pure bred, and he should belong to a family that is noted for maturing early and for aptitude to rapidly lay on beef. Do not buy a

bull because he has a long pedigree. Be sure you have a good animal—that is, one that is good in quality. The bull should have a large open nostril and a mild, clear, full eye. He should be broad between the eyes, and also have a good length from eyes to horn; his horns should be strong, flat and yellow, and he should be straight from tailhead to horns, except that his neck should be a little arched. He should be full in the crops and round in the barrel; long in the quarters with his buttocks well let down to the hock. He should have a full wide brisket, and should be short legged with a clean broad bone, and have a fine tail and an abundance of soft mossy hair. His skin should be loose and mellow. In short, he should be a smooth, straight, thick, low set animal, which, if properly cared for and well handled, will improve the herd with which he is mated. The best time for calves to be dropped is from November 1st to April 1st. When a calf is dropped let it remain with the cow for forty-eight hours, then feed with new milk from the pail for about three weeks. The third week commence mixing a little warm skim milk with the new milk, and keep increasing gradually so that by the time the calf is five weeks old he will be getting skim milk entirely. It is an excellent practice to mix a little cooked linseed meal with the skim milk. It must not be forgotten that castration should be attended to before the calf is more than a month old. The sooner this operation is performed the better. When the calf is about a month old he should be encouraged to eat a little meal. This should be fed in a box in the stall A few pulped roots placed in a box will also prove tempting. A mixture of two parts oats and one of peas or corn makes an excellent feed The feed should be gradually increased, but never feed more than the calf will lick up clean. Clover hay in small quantities should be placed where the calf can have access to it. By the time he is three months old he should be eating a peck of pulped roots and two quarts of meal per day. As soon as grass gets good in the spring turn your calves out every day into a good pasture supplied with plenty of shade and water, but feed them what meal they will eat. At the end of six months the feeding of skim milk may be stopped. When days are very hot and flies are numerous, it is an excellent practice to house the calves during the daytime in a darkened stable letting them out to pasture at night. At noon a little clover hay should be fed in addition to their meal ration. When the nights get long and cool reverse the practice and house the calves at night and allow them to graze during the daytime. When winter comes on the calves will be able to consume their share of the rough feed of the farm. Cut cornstalks and straw dampened, with a little meal added, will make an excellent feed night and morning. Feed roots as liberally as possible, and towards spring feed hay at least once a day. Calves should be kept growing constantly, and never allowed to lose flesh. In the spring do not turn them out again till the grass is well grown, and provide salt so that it is always within reach. Be sure to have a supply of water at all times. Many cattle have suffered excessively during the last two seasons for the want of water. A beast driven to water will fail no matter how good the grass may be, but if the water supply is ample he will continue to thrive even if the grass gets short and dry. Have a piece of fodder corn near the pasture and feed from the fodder when the grass gets short and dry. *Feed generously;* remember that it is far cheaper to make beef on the grass than to make it in the stable.

If the above intructions are attended to, steers will go into the stable in good shape and will not require very heavy feeding to fit them for the block. The best method of feeding the second winter will depend on whether you are going to fit for export shipment from the stable, or to again turn on grass and ship in June or July. The latter is the course commonly pursued in Elgin and in fact throughout Western Ontario. Cut cornstalks and straw dampened in a box with three pounds of meal added for every steer, given morning and evening, with a feed of hay at noon, is the plan of feeding I have employed with two year old steers for a number of years with good success. If roots were plentiful, I would feed a liberal amount of roots and reduce the grain ration. If the cattle are being fed for May shipment, I would increase the grain ration during the last two months. I should endeavor to feed one pound of meal for every hundred weight of animal weight. Sell by the pound rather than by the dollar, and be as careful as possible in driving your cattle to the scales to deliver them. Overheating and bloating will ensue if the steers are hurriedly driven. Cattle should, if possible, be attended to by

one herdsman throughout, and they should be treated kindly and kept as quiet as possible. When in the stable they should be turned out for a short time each day for exercise. They will feed better and make better shippers because of this. The cattle will be much easier handled if dehorned. The dehorning should be done about the time they are twelve or fifteen months old. They feed more quietly and do better in every way after their horns have been removed.

I have dealt in the preceding part of this paper with beef production on the supposition that the farmer breeds and rears his own stock. But there are many feeders in the country who never raise a calf. They buy their cattle at two and three years old, and feed them for six months or longer and dispose of them as fat cattle. To the farmer who wishes to produce beef in this way I wish to offer a few suggestions. First, exercise the greatest care in your selection. The whole question of profit or loss depends on the class of cattle you buy. Buy nothing but well-bred, growthy, thrifty cattle. Have no culls or non-doers among them. Remember that there are steers that will gain only fifty pounds in a season which will consume as much feed as others that will gain two hundred. It will take all the profit on the steer that gains two hundred to let you out with the steer that only gains fifty, so you have no profit on either. Second, buy cattle that are in good condition. The more flesh a steer carries when bought the less feed it will take to finish him. A steer that has been starved and stunted till two and a half years old has lost the aptitude to make flesh rapidly and therefore will not make a profitable feeder. Third, get your lot as even and uniform as possible and try and get cattle of average weight. Aim to get good colors, reds and roams.

THE BACON HOG.

By Wm. Davies, Toronto.

To one who can look back for more than a generation on the pork packing business in Canada, the change in the quality of the hogs, the great increase in the number raised, fed and marketed, and the system of marketing is wonderful. The writer's first attempt to slaughter hogs for bacon for England, singeing them as was done in the province of Quebec, in Ireland, and west of England, was made in 1860, by sending a man to some farms in the county of Simcoe and singeing the hair off with straw; then the farmers delivered them at the curing house in Toronto at the market price.

In the early spring of 1861, the writer drove to Bolton village, thirty miles, taking two butchers with him, when he killed thirty hogs bought from a miller there. The product of these hogs was shipped to London, and the verdict of the trade there was that the meat was excellent, and that if we could get a regular supply of hogs alive and handle them in the English and Irish style, the product would find a ready sale at a good price. The difficulty then was the farmers would not sell them alive. They from time immemorial had killed them and taken them dressed to market, and a great deal of missionary work had to be done before they could be induced to sell them on foot. Gradually they fell in with the new order of things, and now the very large majority of hogs are sold alive, and the number bred and fed has vastly increased. We are very pleased to say the farmers have responded handsomely to our suggestions as regards quality and style.

They have very largely bred long, lean hogs, and have also to a great extent marketed them young, in fact they have erred in this last direction, and far too many little pigs are sold—simply good stores. This is a short-sighted course for farmers to take, and we strongly urge them to feed them to weigh 140 to 200 pounds.

think Canadian farmers err in not making sufficient and suitable provision for sows when

From observation when in England and from conversation with farmers there, I suckling and for pigs when weaned; far too many are kept shut up and fed dry food. The result is they do not grow and thrive, but become stunted and do not give the return for the food they would do if a more intelligent course was adopted.

English farmers sow horse beans and cut them when in blossom or earlier, and the pigs eat the stalks greedily. They also eat green vetches or tares when running in large yards of rough pastures. By this means they are kept very cheaply, and the food being of a bulky nature their stomachs develop, they grow large frames, deep sides and long bodies; and when shut up and fed ground barley, oats and peas they thrive very rapidly.

I feel sure from conversation I have had with good farmers here that profitable pig feeding depends largely on bringing the pigs to four months old cheaply, not starving them but giving them an abundance of coarse food and plenty of exercise,—just as children who have the chance to make mud pies and frolic in fresh air with plenty of bread and butter and milk make stronger and healthier men and women than those who are always kept with clean bib and tucker in warm rooms, with the run of the pantry.

The price obtained for live hogs compared with the price in the United States markets must be very satisfactory to farmers as it is gratifying to pork packers to be able to pay such figures, and this has been brought about by the intrinsic merit of Canadian bacon, the foundation of which is the feed of Canadian hogs. This has enabled Canadian bacon to take a position in England far in advance of American, but this advantage is now seriously threatened and jeopardized by the duty being taken off corn. There is nothing in the Canadian hog constitutionally, or the climate, that gives the Canadian bacon this proud position, it is simply that he is fed on flesh forming food; while corn, which his American brother lives on, makes him obese, fat and oily. It follows as a matter of course that if corn is fed to hogs in Canada to any considerable extent our bacon will deteriorate, and will soon lose its high character and be relegated to the third rate place occupied by American bacon; equally as a matter of course, the price of hogs will decline, and this profitable branch of agriculture decay. No doubt if American corn can be imported for less than the corn grown in Essex and Kent can be bought, it will be a boon to those cattle feeders who can take advantage of it. Canadian beef is not to be compared with Western. Why? Because of the abundant supply of corn. The very thing that makes their beef so superior is injurious to their pork. In whatever way farmers may regard the foregoing, I think it will be of benefit by setting them to think and consider.

The cry of the prophet of old was, "My people do not consider." Speaking generally, this is true to-day, and thousands make no progress because they stay in the old rut.

THE BREEDING AND CARE OF SHEEP.

By Wm. Smith, Columbus.

Although the intelligence of our farmers has shown itself in many ways in the improvement of our ordinary flocks, and the climatic conditions being helpful as well, yet to-day it is doubtful if there is that deep-seated interest in the breeding and care of sheep amongst those especially following mixed farming, that is to be expected. The low price of wool and mutton may have much to do with this lack of interest, and besides many farmers living adjacent to towns and villages have become disheartened by continued losses from dogs and have gone altogether out of the business. Still on every farm a small flock at least should be kept, as they can be easily handled and cared for and cheaply housed in winter, and, besides all, sheep and lambs and their care have many attractions for the boys upon the farm. The breeder of sheep should start out with some object before him, and amongst the different breeds—each with some strong point—he can make his choice; and as the breeding and care of all kinds are very similar, no particular breed need be advocated, but leave that to the farmer himself. Whatever the object in breeding may be, whether pure breds or for mutton and wool, a pure bred ram by all means should be used, a shearling or older being preferred, and he should show all the characteristics of his particular breed. During the breeding season he should be taken away from the ewes at night, and should be freely fed with grain morning and night, oats preferred or oats and bram mixed. After the breeding season is over it will be well to give him

quarters of his own as he is often rough and troublesome with the ewes. If breeding for mutton and wool it does not follow that the ewes should be pure bred, but at present prices animals of any of the different pure breds should be within the reach of every farmer, or at least he should be able to commence with at least one ewe, and it is surprising under ordinary conditions how soon a flock of pure bred females can be raised. Pure breds have their advantages, whilst costing no more for care and feed than grades they often find purchasers for breeding purposes of both sexes at somewhat better prices than for killing purposes, and besides like good surroundings they add to the appearance of the farm.

Breeding ewes need not be fed extravagantly during the winter months. Too many roots are bad, but I have never found any difficulty with about two bushels of turnips amongst twenty ewes daily, divided between morning and evening meals. Oats may always be fed with safety and advantage, not only improving the wool but the progeny coming much stronger and more vigorous. Clover hay is excellent feed, and besides they are fond of and will do well on properly saved pea straw. They should during all seasons have access to salt and good pure water. That sheep will live and even thrive without water may be true, but compelling them to do without water is nevertheless cruel and inhuman. During winter months ewes should have exercise, but on no account amongst horses or cattle. Many farmers claim good results from the mixture of sulphur with salt for breeding ewes, but this does not coincide with my experience, although answering well for younger sheep. Ticks should be destroyed, and change of pasture will be found most beneficial I recommend rather than not change at all, that it should be from good pasturage to bad, but let it be a change, and as often as possible at that. The racks should be upright, thereby saving the wool from dust and dirt. The lambing season should not be one of great anxiety; if the above rules are followed the lambs will come strong and healthy. A separate apartment for the lambs should be provided where the ewes cannot get. Clover, hay, pulped roots, and ground oats should be fed, and it is surprising how soon they will eat heartily. All experiments go to show that the lamb will well repay the farmer for extra feed and trouble, and besides will not worry the mother as much. This should be continued until going on the grass when lambs should continue to grow without further trouble until weaning time, which should be when about four months old. When weaned the lamb should be put on clover or rape, and if intended for slaughter may get a little grain. With or without grain, in a couple of months lambs should be in fine condition for sale or to go into winter quarters. If wintered, plenty of clover, hay, roots, and grain should be given. All lambs should be docked during the first week of their existence, and all ram lambs not intended for breeding purposes should be castrated before a month old. There is a good and growing demand for early lamb commencing shortly after New Year's, and where winter quarters are fairly warm all difficulties may be overcome in raising and good prices realized as well. Ewes and lambs too, will all pay well for trimming quite often, thereby not only saving the wool but adding to their appearance. Whilst sheep will stand a great deal of exposure they pay well for a little trouble in housing in the late fall, and on no account should they be exposed to late rains or soft snows.

Nothing has been said about the different methods of breeding, such as, "In and in breeding," "Line breeding," etc., etc. We have already the sheep in Ontario and the intelligence amongst our farmers which, if properly used, should make the breeding and care of sheep a profitable adjunct of mixed farming.

SELECTION AND CARE OF A STOCK RAM.

By Richard Honey, Warkworth.

This a very important subject, for the ram is half of the flock. As a sheep breeder, I do not think we can be too particular in our selection. In the first place, we should select the breed best suited to our locality. I purpose describing what I consider a useful stock ram.

The mouth should be large with broad nostrils. The upper part of the nose should be full giving a masculine appearance but not Roman. The eye should be full and bright and the top of the head and ears true to the type of the breed you have chosen. The head should be high enough for the straight line of the back to come underneath the eyes; the neck large, standing well up and of a medium length. Shoulders broad and flat (just the reverse of those of a dairy cow or of a saddle horse); well sprung ribs; broad loin; long in the hind quarters; large tail; every joint of the backbone smooth and well covered with flesh; large leg of mutton; hind legs medium length and standing well under the body. The testicles should be of medium size, and the scrotum well covered with wool; flank deep: belly large and well covered with wool; brisket broad, deep and set well forward; front legs of medium length and far apart, giving plenty of room for the heart and lungs.

With regard to the care of the ram, he should be kept in a strong, healthy condition but not overburdened with fat. He should never have an apron or a board put on him. He should not be allowed to run with the ewes more than half of the time during the mating season. He should be fed liberally with oats during the breeding season, but he should not be allowed to run with the pregnant ewes through the winter.

HORSE BREEDING.

By Robert Ness, Howick, Que.

The breeding of domesticated animals for the various purposes to which they are adapted has been practiced from the earliest times. The oldest writers on agriculture give directions for the breeding and improvement of live stock, and many of their maxims are repeated to-day as the best practical guides to the breeder. Probably it would be well to notice some of the general points which underlie successful breeding and which should be generally known. Heredity, so well expounded by Darwin, is the perpetuation of like characteristics in parent and offspring. The general principles which govern the transmission of hereditary qualities from parent to offspring are without doubt the same throughout all animal life. This characteristic has long been known, and the result of observation forcibly expressed in the familiar aphorism, "Like produces like," and as an inference of this generally accepted law of the animal organization we would naturally breed from the best. This selection as "best" must not be continually changing else no progress will be made, as heredity only transmits with certainty what has become a fixed characteristic in the breed. Bakewell, who was one of the first improvers of the live stock of Great Britain, regarded the animals on his farm as wax in his hands, out of which in good time he could mould any form that he desired to create. He believed that the familiar maxim, "Like produces like" was not limited to a general similarity of offspring to parent, but extended to the minutest details of the animal organism. What can be said on heredity with regard to normal characters also applies to disease. Any abnormal peculiarities of the animal organization constituting disease whether of structure or function are liable to be transmitted from parent to progeny. Hereditary disease may be congenital, i. e., make its appearance at the time of birth, or a considerable length of time may elapse before any indications of its presence are observed, in which case a predisposition or tendency to the disease is inherited which often requires some external exciting cause for its development. There are certain diseases that are transmitted with greater uniformity than others, yet a predisposition to almost every known form of disease is likely to become hereditary, even if the influence which determines its transmission is not sufficiently intense to render it congenital. When the general constitutional predisposition is inherited the conditions to which the animal is subjected as to food, exposure, etc., may have an influence in determining the chief organ in which the disease is developed.

In the selection of breeding stock the first step for the breeder is to decide which sort of a horse will bring him the best returns. Success in the breeding of live stock

must be measured by the actual value of the products and profits that may be derived therefrom. If his interests lead him to breed for the race-course, he must keep constantly in mind the fact that for this purpose, whether for running or trotting, speed and endurance of the very highest order are indispensable. The ordinary breeder must consider the horse that sell best in the market, or rather the horse for which there is the greatest demand. First, the large, stylish, high stepping carriage or coach horse to breed from. Such horses may be bred with a degree of certainty; such as prove deficient in style and action make good express horses, but to command the best price they must be rather "rangy" and possess higher knee action than is desirable for ordinary work. Second, the heavy draught horse from 1500 pounds upwards, as heavy as possible without departing from quality to obtain weight. In the selection of the sire you must first investigate his pedigree which, as you know, consists of the names of the ancestors for a greater or less number of generations. Its value consists not so much in the number of generations through which the ancestry can be traced to some sire, as in the quality of character of the ancestry or the merits of individuals that compose it. Having satisfied yourself of his breeding you now secure the form of horse desired. There are, no doubt, several breeds of draught horses, all of which have their good qualities and their faults, but for the purpose of description I shall try and enumerate the points necessary in a good draught horse without taking up any special breed, which are, beginning at the head, as follows: The head should be of medium size in proportion to that of the body. The forehead broad between the eyes, tapering upwards in the direction of the ears. The jaw broad, but not large or loaded with flesh. The nasal bones if not straight slightly arched but not dish-faced. The muzzle not too refined or tapering with the nostrils wide. The eye bright and dark, full and vigorous, yet mild. The ears of good size tapering to a point, neither hanging, showing sluggishness, nor prick eared, but with frequent motion indicative of a good disposition. An animal having such a head is rarely of a vicious temperament, which latter must be rejected in a breeding sire. The neck should be of good length, clean cut at the jaws, well set on at the shoulder with a gradual tapering from the occiput to the highest point of the withers. The chest must be broad, full, and deep; a hollow chest shows decided weakness. The shoulder should be closely knit at the withers and oblique, though not necessarily so much as in the race horse. The back should be short and strong. The ribs of great depth and rounded—barrel-shaped. He should be full at the heart and girth well allowing plenty of room for the expansion of healthy lungs. The depth of body at last rib should be great, as this is too often a defect in draught horses and a serious one, as it suggests a poor feeder and also gives a lanky appearance. The hind quarters must be of good length, well muscled, and round, the thigh being well developed and strong. The last in consideration, but by no means the least, are legs and feet, as I decidedly hold "No foot, no horse," and observation should confirm the statement. The indications of a good leg are primness, hardness, and smoothness to the touch, an entire absence of adipose tissue, large well defined joints free from any abnormal appendages. The knee joints should be broad and flat; the hock wide from before backwards, giving the leg a somewhat crooked appearance rather than straight, the former giving strength. The length of bone short from the knee and hock to the pastern. When standing the hock should tend to be close. The pasterns should be of medium length and sat on rather obliquely so as to give the necessary elasticity to counteract the concussion caused by the firm step. If long, they are weak; if short and upright, they are liable to knuckling. The feet are, of course, very important. In shape the medium between a flat foot and a mule foot is preferable, of good size with a large degree of concavity in the bottom, and must also be firm and elastic, without cracks, and free from brittleness. The fore and hind legs must be set on straight, as an out or in-toed horse is decidedly objectionable. All the preceding points are to be observed in the standing posture, and when fully satisfied in these particulars it is most essential to see that having four good legs the horse has the ability to use them properly; that he steps with a firm elastic tread, and, especially in the draught horse, he must be a good smart walker; notice that the legs and feet do not get in the way of each other when he is in motion, but move freely without interfering. The general management of the sire is of great importance. It is a frequent mistake to have the sire in fine show condition when

he season opens and apparently in the pink of condition, for he is not nearly so well itted for service in the stud as he would have been had this extra feeding been dispensed with. Such treatment is a drawback to the horse as a sure foal getter. The point to be aimed at in the stable management of the sire is so to feed, groom, and exercise as to keep the horse up to the highest pitch of strength and vigor. He should be well and regularly fed on healthy nutritious food with plenty of exercise every day, well groomed, and the skin kept clean by frequent brushing and rubbing, which also keeps circulation in good order. A healthy animal needs nothing but good food, pure air, plenty of exercise, with due attention to cleanliness, regularity of feeding and watering. If such be attended to, but little will befall him unless by accident. He should be kept in a loose box at least 12 x 16 feet, more if possible, which admits plenty of sunlight and has good ventilation, containing internally as few projections as possible upon which he may injure himself.

In the selection of the dam the same may be said as of the sire. It is desirable that she should have a great depth of body with well sprung ribs. As a rule, the female of any breed is somewhat finer in build than the male, and seldom reaches the relative weight of the sire. She must, as in the sire, be sound and free from viciousness. What was said of overfeeding in the sire also applies to the dam, and is supposed to be the cause of barrenness to a certain extent in the dam. It is not advisable to breed before the age of three years. When the time of foaling approaches, the dam should be turned loose in a large box stall; or, if the weather be mild, in a paddock. About the best time for foaling is the latter end of May as there is an abundance of green food, and this is before the heat of summer sets in. The mare should be closely watched, and there are certain signs of parturition which rarely fail. The udder becomes greatly distended some time before foaling, but the teats seldom fill out full to the end until a day or two before the foal is dropped. When the mare is a valuable and well bred one and the foal expected to be a good one, it is well worth watching her closely, as many valuable animals have been lost, which, by a little attention at the right moment, might have been saved. For a certain time previous to parturition she should be fed on soft food so as to keep her bowels free from constipation. Many mares are at the best poor nurses, but her food may be made to greatly influence her yield of milk. It is highly necessary that the foal should be supplied with milk from its own dam. The foal should always be allowed free access to its dam, otherwise it may result in constipation or some other derangement which is serious in every young foal. After eight or ten days the foal will probably give no further trouble. The weaning of the foal should be done gradually. It is always well to have the foal taught to eat all sorts of food before removing it from the dam, and it should be handled well and carefully from its birth. If such be carried out properly when weaning time has come, which should be done at five months, confine the foal in a loose box in which there is nothing for it to get entangled amongst, and feed on soft food which you have already taught it to eat. In the meantime, the mother's diet should consist of dry feed, and it is well to put her to work. The milk must be removed but not milked dry every time. With the dry feed and work, secretion of milk will soon cease. From this time until the foal becomes a yearling it should be well fed, as a stunted foal never matures properly, and more foals are injured during the first six months after weaning by a too scanty supply of food than from the opposite extreme. Of late years, breeding has not been extensively gone into in this Province, but I think the man who has persevered in breeding a few good ones will meet with decided success, as there are, comparatively speaking, no good horses to be had at the present time.

HORSE BREEDING.

By Albert Davidson, Glandine.

It is with pleasure I introduce the subject, although I know that horse breeding has become unpopular. During the past few years, prices dropped so low that horse breeders sustained a serious loss. The market has not yet improved sufficiently to warrant any large ventures, still I prefer to have an occasional horse to sell rather than one to buy.

Horse breeding ceased so suddenly that there may be a shortage of horses and a consequent rise in prices. The low prices of our horses has found them a market abroad, and will introduce them when otherwise they would probably never have gone. The Canadian horse has proved himself to be among the best of his kind wherever tested, and for this reason those who buy him may want more from the same source in the future. The exportation of live cattle to Great Britain being in a measure restricted, would it not pay us better to send horses against which there is no restriction? If we refer to the statistics for Ontario, we find that we have over twenty two thousand less brood mares in the province now than we had in 1894. Thus we find that the low prices of horses has had the effect of putting us in a position from which it will take years to recover. During the past few years, a good horse could be disposed of at some price, while an inferior animal could not be sold. In this way we were forced to sell our best animals, whether geldings or mares, and thousands of our best mares have been shipped out of the country. We also find that we require over thirty-eight thousand more work horses in this Province now than we required in 1894, and we know that this demand for home use will continue to increase as each year more land is brought under cultivation. While the number of unbroken horses or colts in Ontario show a decrease of over sixty-six thousand during the same time. It is evident, then, that horses will be wanted, but as to the kind of horses we should endeavor to breed, there is a great difference of opinion The horse stock of this country seems to be an admixture of every breed and type of horse in the known world. Very little intelligent effort has been made to keep the breeds pure. We have crossed in and out until it is only occasionally possible to trace a pedigree for even four generations, without finding an admixture of blood from distant types. To this admixture of blood in the stock selected for breeding purposes is to be attributed some of the disappointments and failures we have had in breeding. We have been told that like produces like, but this is true only of characteristics which have become finally fixed in the ancestry. For this reason we should use a pure bred male as a sire, even though we are obliged to use a mare less well bred. The breeder must first decide what kind of a horse he wishes to produce. Farmers seldom agree on this point, and are, I believe, too ready to change from breed to breed according as there appears to be a demand in the market. If we would cease trying to breed trotters, cavalry horses or extreme high steppers and try to produce the kind of horses that are most suitable on the farms, we would have fewer disappointments, and soon a vastly better and more saleable class of horses would appear than we have at present. For the best class of carriage and road horses the price may yet be high, but I do not think that the ordinary farmer can afford to breed for speed. That should be left for gentlemen of means, who with the choicest of brood mares as well as stallions, may take the chances of breeding a racer, for they are not produced with certainty even by the most experienced breeders, and when produced require an expensive training. The ordinary farmer must raise a horse that he can sell. He must breed from mares that are able to do the farm work satisfactorily and produce colts which at an early age will be saleable. As to what class of horses willbe saleable four to five years hence, we can only conjecture, but I believe that there is a growing demand for farm horses, and those will be the most profitable to produce. Electricity or other motive power may displace the horse to a great extent in our cities and from our roads, but it is not likely to do so on the farm for many years. We may differ as to the kind of horse the farmer needs, but he should combine in a fair degree both action and weight. I prefer a compact short legged horse weighing from 1300 to 1500 lbs. There is no practical difficulty in producing such horses even from our miscellaneously bred mares, as well bred draft stallions have proved themselves successful sires of this class of stock. Such a horse can be raised almost as cheaply as a steer of the same age, the only additional cost being the stallion fee, which is now at a very reasonable figure. There will be little or no expense for training or breaking, and as soon as old enough such a horse will sell readily unless seriously blemished. We have made mistakes in the past in being anxious to produce horses of extreme size, and have bred for that regardless of quality. The produce was not very satisfactory ; they lacked endurance, were apt to have poor feet, or unsound joints, especially the hock joint, with legs round and beefy and predisposed to scratches and other ailments. The depressed horse market and the consequent close dis-

crimination exercised by buyers, have shown us the necessity of endeavoring to produce useful animals of superior quality, and to produce such we must select our breeding stock with more care. It is frequently the case that mares which have become worthless through some defect in the feet or legs, or on account of a baulky or vicious temper, are used to breed from, and the probabilities are that they will transmit to their offspring a predisposition to like defects, for defects are as likely to be transmitted as more desirable qualities. It is unprofitable to produce an unsound or vicious horse of any class, and if you wish to breed horses, I would advise you to provid yourself with a good tempered mare free from any unsoundness, and mate her with a sound horse of good quality. The time has gone by when the mere fact of being imported should commend a stallion to patronage, and breeders must be as careful in selecting a sire as they are in selecting a horse for their own work. Size, shape, color, action, and style should all receive some consideration, but undoubted soundness should be the first requisite. The owner of the stallion or his groom may have very plausable excuses for apparent defects in their horses, but breeders must learn to discriminate very closely if they would produce good saleable horses, and those only are profitable.

FEEDING WORK HORSES AND COLTS.

By W. C. Edwards, Rockland.

Some years ago we adopted a method that was in a measure new to us, but it has proved highly satisfactory and profitable, and nothing would induce us to return to the old system. We employ, say forty horses about our mills here in the summer season. In the rear of our stables we have a feed-room where our cut straw for bedding and our cut hay, oats and ground feed are kept; and here we have two mixing boxes where the rations for the horses are mixed before feeding. The cut hay is put into these boxes and is thoroughly soaked with water twelve hours before it is fed. The ground feed is mixed dry, and before feeding is thoroughly mixed with the wet hay. The ration we started out with was four pounds cut hay, one half pound bran and five pounds ground oats and barley to each horse night and morning, and four pounds dry oats only at noon. Our horses are generally of large size and are doing excessively hard work and we found this ration too small for them, and we gradually increased it until we have settled down to this: five pounds hay, five pounds ground grain and one half pound bran to each horse morning and night, and eight pounds dry oats only at noon (no hay) and this we find ample for the largest class of horses doing the most excessive work. Our saving is at least ten pounds hay per day for each horse and six pounds grain for each. Not only is this the case, but our horses are healthier and better in every way. Under the old system it was a common thing for us to lose from one to five horses every summer and somtimes even more, with colic and inflammation, but in the past seven summers under our new system, not only have we not lost one horse, but we have not had a sick horse. A much less ration than we feed would be ample for farm horses or for any horses doing ordinary work. We may add also, that with this system of feeding hay, together with the free use of wheat bran and a little ground oats mixed with it, we find we can develop colts in a manner that we have never seen them developed before. The farming industry of Canada is truly passing through a most trying crisis That our good farmers will survive all their difficuties, I have no doubt; but new and improved methods must be restored to, and I can assure you that in the method of feeding horses that I have given you, as compared with the old and usual method, there is the difference between success and failure in the matter of raisng colts for sale, and if what I have said is of assistance to any of our horse breeders or feeders, I shall be greatly gratified. Through the many agricultural journals and bulletins published in Canada and the United States, I am almost daily getting some new idea as to general farming or the care and management of stock. These ideas come not only from the editorial pens of the several papers, but many

of them from practical and experienced farmers all over the land, and had I the time and capacity to do something in return it would give me very great pleasure to do so I am a firm believer in reciprocity. If in a national sense we cannot have this with our neighbors to the south of us, let us do the next best thing, and through the interchange of ideas among ourselves, build up a thoroughly advanced and progressive agricultural country. Our farm journals are doing much, and our Farmers' Institutes are also assisting ; but there is much more to be done and every Canadian who wishes well for his country should do what he can to promote the improvement and advancement of our agricultural interests. In them are the foundation and very backbone of our country, and with few exceptions, indeed, will all our other industries prosper just in proportion as our agricultural interests prosper.

WINTER CARE OF IDLE HORSES.

By A. C. Hallman, New Dundee.

There is probably no subject that is of more importance, yet, has been given less attention at Institute meetings, than the winter care of idle horses.

We find, according to statistics, that there are now in Ontario, 647,699 horses, valued at $40,283,754 ; out of which there are 423,673 working horses, 72,156 brood mares and 151,867 other horses, such as colts, stallions, etc. Out of the total number of working horses, at least fifty per cent. are idle during the winter months. How to support them cheaply and keep them in good health and flesh during this period is an important question. My object, is not so much to give the best method of caring for and feeding, but to draw out discussion on this subject. It is only by combining our thoughts and efforts that such valuable information can be obtained.

If we make a study of the horse and his digestive organs, we find that the first stage of digestion takes place in the mouth. It is important that we examine the teeth to see that they are in such a condition that the animal can perform perfect mastication. We find in our own observation and experience, many horses very badly out of condition, sluggish, no snap, rough in the coat, will not eat or thrive under any conditions, neither feed or tonics are effectual. On examination we found bad teeth had caused all the trouble. We must then remember this very important fact, for we expect the idle horse to work up more bulky and less valuable food than when he is hard at work. Stewart says, in his work on "Feeding Animals," "In the mouth are crushed all alimentary substances, which are often very hard, resisting and rough, and nature has provided a very thick epidermis to cover the mucus membrane of the mouth to protect it from injury in those points that come in contact with the rough, hard substances, as on the upper surface of the tongue, palate, roof of the mouth and cheeks. And it is in this mucus membrane, covering the tongue that are situated these small organs of taste that give perception of flavor, thus exciting a desire for food and no doubt informs the animal of the good or bad quality of the food. The saliva is secreted by glands situated in the cheeks and this fluid softens the food, assists in its mastication and must have some chemical action upon the food after it reaches the stomach."

We are also told that a horse or an ox is supposed to discharge two quarts of saliva in half an hour whilst masticating its food, and this is sufficient to ensalavate a small ration of hay or what the animal could masticate in that time. The mere sight of food caused the mouth to water and the harder and drier the food the more saliva will flow during mastication. The saliva must be considered a most important factor in the process of digestion. Now, we find the stomach of a horse is very small considering the size of the animal, much smaller than of ruminating animals. Anatomists tell us the stomach of an average horse holds about three gallons. It is very important then how this small receptacle is filled. We know that a healthy vigorous horse will eat a tremendous lot of stuff when idle and the food placed before him. One half the diseases of the horse, I believe, are due to over feeding. Especially with young horses or such as

are not put to severe work. They are even placed before a full manger and are like children gorged with bread and butter, they eat merely for amusement, until at length, the stomach becomes gradually distended, the appetite increases in a relative proportion, becomes sooner or later voracious and finally merges into a mere craving, it making no difference what the food is, so long as the stomach is filled. This depravity of appetite is always accompanied by more or less thirst. Horses have been known to eat thirty pounds of hay in a day and night when ten pounds should have been sufficient. On eight pounds of hay, with a due allowance of oats or other food, a horse can be kept in prime health and spirits.

It is an easy thing to keep a horse in condition with a due allowance of hay and grain, but the secret is how are we to get them through the cheapest and at the same time insure good health. In feeding idle horses we require a ration of not too nutritious a character. No definite rules can be laid down for feeding. Circumstances vary. Every farmer must make the best use of the feed he has. At the same time it ought to be our aim and object to grow such food as is best suitable for a special purpose. Cut straw with clover hay, half and half, a fair quantity of corn ensilage with enough grain to keep in a good thrifty condition, and a whole turnip thrown in twice a day, forms a very complete ration. However, horses can be kept without hay, with all straw instead and much in preference to all the hay they will eat. Daily exercise is of great value. Idle horses should be turned out loose every day for a few hours if not too cold or stormy. All the better if they have liberty for a large run. The feet should also be well looked after in winter and the shoes removed. It is very unsightly and injurious to leave shoes on for months. Clean stables are very essential. They should be cleaned daily. Very injurious results often follow from horses being tied up in a stable sometimes for a whole week before the manure is removed. I have seen horses standing at an angle of about forty-five degrees on account of this; this alone is injurious; besides, the ammonia that will constantly escape will damage the feet and eyes.

Experiments were made in England years ago by the London Omnibus Company, who had 6,000 horses, to determine and test the relative value of cut and uncut hay, as well as ground and unground grain. To this end, 3,000 horses were fed upon uncut hay and unground oats. The allowance was 19 pounds of oats, (unground); uncut hay, 13 pounds. The other 3,000 were fed on ground oats, 16 pounds; cut hay, 7½ pounds; cut straw, 2½ pounds. The horses that had the 26 pounds ground oats, cut hay and straw did the same amount of work and were kept in the same condition as those that had the 32 pounds unground oats and uncut hay. This was a saving of six pounds per day on the feed of each horse and was estimated at five cents per day on each horse, or $300 per day on the 6,000 horses.

THE HORSE AND ITS MARKET.

By Prof. John A. Craig, Rice Lake, Wisconsin.

To understand the requirements of the market, it will be necessary to consider the horse as a mechanism in which the bones are levers, the muscles the source of power, and the nervous system the stimulator of the muscles. The horse is valuable in the market because of his ability to perform certain kinds of work, and for that reason it is very necessary to know how these features adjust themselves in the performance of work.

The Bones as Levers. There are three classes of levers, and these are all represented in the skeleton of the horse. The first class may be said to be represented by a pair of scissors, as the power is supplied in the hole for the fingers, and the fulcrum is in the centre where the blades are united, and the application of the power is at the point. This is the most advantageous form of leverage, and it is employed in the skeleton of the horse by the parts that are used in the extension of the limbs.

The lever of the second class may be said to be represented in every day life by the wheelbarrow. The power is applied at the handles, the weight is in the centre, and the application is at the wheel. This leverage in the horse enables it to sleep standing, or to stand without feeling the strain. It is the leverage which prevents the joints closing on each other.

The leverage of the third class is represented by a pair of sheep shears. The power is applied at the centre, the fulcrum is at one end, and the application of the power is at the other. This leverage is not common, but it is shown in the action of the lower jaw of the horse

Action of the Muscles. In further consideration of the leverage the attachment of the muscles and their nature are important. As muscles consist of bunches of fibres, it is easy to understand that when these fibres are long there is more elasticity than when they are short. The long muscle with long leverage of the bone is more favorable for quick action of speed, while the heavier muscle is more favorable for draft or power. The attachment of the muscles to the skeleton is also of some importance. When the muscles, by means of the tendons, are attached to prominences which enable them to work free from the bone that furnishes leverage, it is easy to see that the action of the muscles would be freer and more effective ; hence in most joints there are prominences to give the muscles the best attachment.

In this connection it is interesting to study the proportions of the bones of the skeleton to find reasons for the advantages which certain relative proportions produce. In general we look for short bones in those parts where the function is simply the transmission of power, while we desire greater length in those parts where the muscles, the source of power or speed, are to be found. In the front leg, for instance, we expect length from the elbow, or where the leg joins the body to the knee, and a much shorter distance from the knee to the fetlock joint, for the reasons that have been given.

Function of the Nervous System. In studying the horse as a mechanism something more than bone and muscle must be included. The stimulation for action comes from the nerve power or force. The nerve power is represented centrally by the brain, and from there it is carried to all parts of the body, from the spinal cord through the main channel of the vertebra, and from this it branches out to stimulate the muscles. The stimulation for action must come from the nerve centres, and these have a great deal to do with the quickness and strength with which the horse may act.

General Market Qualities of Light Horses. Before considering the market qualities of light horses in detail, it will be best to take a general view of the requirements of the market in respect to the form, quality and action of the horses that sell for the highest prices.

Form. To analyze the form of any market type of horse, it is necessary to understand the extent to which the form is due to the skeleton, and how much of it should be credited to the muscular development. A comparison of the skeleton of the horse with the living and well developed animal will show clearly that some parts owe their form entirely to the bony framework, while other regions are shaped wholly by the muscles. Beginning at the head it will be noticed that its form is determined by the bones that comprise it. The outlines of the neck are made altogether by muscles. The shoulder and the chest are outlined and formed by the skeleton, while the shape of the leg from the knee upwards is determined by the muscles of that region, and from the knee to the fetlock chiefly by the tendons that makes the leg at this point appear flat from the side. The form of the body is covered largely by the rotundity of the ribs and the width of the loins. In the hinder quarter the upper part is moulded almost altogether by the muscular development, and the same may be said of the thighs and the quarters, while the tendons of the leg give the lower part of the latter its shape.

And it is said of the degree to which the skeleton and the muscular development contribute to the form of the horse brings forward the idea that most of the power resides in the hinder parts. The fact that the greatest muscular development is in this region would indicate this. It will be noticed that the form of the loin, the shape of the crupper

and the fulness of the thigh are due in the greatest degree to the extra development of muscles in these parts. The front quarter is bare of muscle in comparison with the hind quarter.

Another reason for accepting this theory is the difference in attachment of the fore legs to the body in comparison with that of the hind legs. The shoulder blade is loosely attached to the trunk, while the hind leg connects with the body through the agency of a strong ball and socket joint. The shoulder blade plays loosely, seemingly for the purpose of lessening the concussion that the leg receives from contact with the ground, while the hind legs connect with the pelvis at a joint which is the most powerful in the body.

The market for light horses recognizes three leading types—the carriage horse or coach horse, the trotter or roadster, and the saddle horse.

Coach or Carriage Horse. The distinguishing feature of the coach or carriage horse, is its symmetry and action. The height should be about 16 hands to make a good appearance. In contrast with the roadster, the carriage horse is very smooth and symmetrical. The smoothness should be due to plumpness of muscles over all parts. In the carriage type the head should be comparatively small and lean; the ear neat, the neck long and carried gracefully; the body round and plump, and the limbs clean cut, with well formed and durable feet. Graceful carriage and stylish action are leading qualifications.

Style when in any posture is a very desirable attribute in the carriage horse. A critical examination of this type would indicate how far the position of style depends on the adjustment of the parts of the frame work. When a carriage or coach horse possesses characteristic style there seems to be an appropriate blending of all proportions of form. In analyzing this it will be found that most of the lines have a smaller direction in addition to the fulness of outline already discussed. The line running from the pole to the nose seems to be parallel to that of the shoulder. Then the line running through the centre of the pastern also has a similar direction, while the line of the thigh in the hind quarter corresponds with the slope of the hind pastern. Considering the lines that run different from these, it will be noticed that the one made by the arm from the point of the shoulder to the elbow is very similar in direction to that made by the ischium of the pelvis, and this again is similar to that of the lower thigh. Each part seems to bear a fixed relation to every other part, both in size, length and slope, giving the horse that symmetry which contributes so much to his style and beauty, while standing or in action.

Trotter or Roadster. The chief characteristics of the roadster are speed and stamina. The ability to trot fast is a leading characteristic of the roadster, and the ability to maintain a rapid gait is clearly essential in a horse of this kind. In addition to being able to stand steady road work, such a horse should sell well on the market and must be well mannered, so as to be safe and pleasurable to drive.

The typical roadster may be said to be about 15½ hands high and about 1,000 pounds in weight, the formation is narrow in front, deep chested, wide at the loin, and very muscular in the quarters. Every feature about the horse appears clear cut giving a hard finish which indicates durability. The lineaments of the face and the outlines of the neck, and especially the distinctness with which the tendons stand away from the leg, are very characteristic features.

The illustration lacks the fulness and symmetry that are characteristic in the carriage or coach horse. To do effective and hard work on the road is a sphere of the roadster, and a type that has been evolved is an illustration of the evolution of a form for a specific purpose. The type of the best campaigners that have a mark of 2.10 or better will show a similarity that indicates the type towards which the trotter is tending, though it should be noted here that the roadster in show form will display quite different outlines after being subjected to a hard training the campaigner receives.

Saddle Horse. The type of the saddle horse that is desirable on the market is somewhat similar to that of the light carriage horse, but the typical saddle horse will show more quality and better manners than any other class of light horses. Aside from

these features, the chief qualifications of the saddle horse is the ability to show the following gaits in a satisfactory manner: Walk, trot, rack, canter and running-walk.

Quality. In a general way all these types of light horses should sell to advantage, and to do this must be possessed of high quality. This form applied to horses refers to their bone, skin, hair and to other features of their organization. Evidences of quality are clean cut features, glove like skin, silky hair and firm bone. In the instance of the horse possessed of quality, the lines of the face are clearly defined, and in every region there is a complete absence of coarseness. It is possible in such a horse to distinguish easily the muscles, tendons and bones, and when the animal is slightly exerted, so that the coat lies smooth, the veins in the skin show clearly in an intricate net work, so delicate and fine grained is the skin. This freedom from coarseness in the joints and tendons, and in other parts, shows a soundness in these features that guarantee much endurance. Coarse hair is associated with the coarse skin, and that is a true indication of soft spongy bone that quickly becomes diseased when subjected to a strain of hard usage or neglect.

Action. Still, considering the market for light horses in a general way it will be found that a necessary characteristic of all the types is good action. Action is desirable chiefly for its utility, but also for the many other qualities which it indicates. It goes without saying that the light horse with good action is very durable and more enjoyable, as the work is done easier; but looking still further into it, it will be found surprising to notice the other attributes that are attendant upon it. The action of a horse reflects his temperament, proves the balance of his conformation and indicates the degree of soundness.

Without considering the qualities of the walking gait, which may be more properly discussed in referring to the draft horse, it will be sufficient here to describe the characteristic trotting gaits of light horses.

Qualities of the Walking Gait. Excellence at this gait is a very desirable quality in all varieties of horses, and, unlike the trot, its meritorious features are the same in all, as it has no connection with type. In the enjoyment of a road horse there is much to admire in the manner in which he conducts himself when walking. It is questionable as to which is the most pleasurable to observe—the walking of the horse whose step is evenly timed and nervy, or the trotting of one that has all the grace, style and snap that characterizes the coacher. In moving away from you the feet of the good walker leave the ground with a quick snap, showing in their passage the glint and reflection of the whole shoe. After leaving the ground with this peculiar snap the foot swings upward and forward, then the knee unfolds, the pastern carries the foot gracefully forward and it again comes to the ground lightly but firmly, with the characteristic spring and snap that identified the first movement. The feet move straight away, swerving neither to the left nor the right, nor should the folding of the knees or the flexing of the hocks result in an outward pitching or spreading. A horse that will lift and plant his feet in the way described almost invariably has the up-headed and commanding appearance in movement which is so admirable in the harness horse. The crucial test of the balance of a horse's walk is the side view. Any variation from proper structural proportions results in wobbling, hobbling or an otherwise uneven walk, and all these are readily seen from the side. The levelness with which a horse walks is one of the best evidences that the legs work in harmony. The most common deflection from this is attributable to a long, slim coupling which gives the onlooker the impression that the horse might break away into two parts near the region of the loin. In defective conformations of this kind the stride of the hind limbs is short and he usually has an uneven, choppy gait that is unsightly as well as being ineffectual in covering distances. On the other hand, an opposite relation of the parts, close coupling and short back, with long legs, is likely to give use to a slovenly swinging gait, producing clicking, stumbling or other defects. If there is a flaw in the mechanism of the front legs it is usually made evident by the movement of the front feet, especially as they are about to touch the ground. If the limb proportions are ungainly the feet do not seem to reach the ground at the proper stage, either turning too much on the heel or not turning enough, and precipitating the toe.

The Action of the High Stepper. The highest priced action in the general horse market is that of the high stepper. The peculiarity of this action consists in lifting the knees inordinately high and flexing the hocks so that they come close to the body and keep the legs well under it. From the standpoint of action alone, the higher the knees and hocks are lifted the more valuable is the horse, provided that the type and other features more common are equally satisfactory. The feet must be thrown forward without any dishing on either side, and the hocks must pass each other close and in line with the forward movement. It is easy to understand that while this method of movement is the most showy and stylish, it is not serviceable action for a road horse. The front legs soon succumb to the heavy concussion they would be called upon to stand under hard driving. But this action is sought only in the horse that is used for short drives about the city where style is paramount to speed and stamina. While it is recognized that the high stepper should have as many as possible of the other qualities of excellence in addition to high action, yet all others are considered of minor value among horses of this class. "All-around action only to be considered," is the current phrase in the prize lists that provide classes for competition among the high steppers, which means a combination of shoulder, knee and hock action.

The Carriage Horse in Motion. A connoisseur of horses will see much more than the legs of a carriage horse when he is moving. As he moves along before an appropriate vehicle, with the latitude of a light hand assisting, him there are flashes of gracefulness from every motion. With this there is a quality of mind that gives buoyancy to step and accounts in no small degree for the uplifted carriage of the head. It is expressive of a happy temperament that gives gracefulness to every pose and a smooth flow to every movement. Such a minor organ as the ear plays its part in carriage and quick action. The eye shows the fire within, and challenges the critic for its mead of praise in measuring the step and alertness in giving it security. Scan the lines of the neck, notice their tenseness, and yet the unusual elasticity it shows when occasion offers for a movement of greater gracefulness. The shoulder plays with freedom, and the smooth turned loin and quarter seem the only regions that are not taking part in this unusual display, though in this immobility they showed their real strength.

As to the action of the fore legs, it is straight away with a continued folding and unfolding. In the action of the carriage horse there must be some style and dash and high lifting of the feet, but never enough of it to make the action unserviceable. At no time is the fore leg held in poise, nor does it dwell either in flexion or extension. The leg folds and the foot snaps from the ground and is then carried forward, and the limb unfolds as if following the rim of a wheel. It seems to reach the ground at the right stage of the unfolding, so that it is not held in suspense at any point along the line of descent. The feet pass close and in a straight line, so that there is no swaying or dropping down of the forehead with each step. The hind foot leaves the ground with the same quick movement, and at no time is it allowed to hang back so as to give the horse the appearance of not gathering himself well together. After all is written that it is possible to write about the action of the carriage horse, there is something else that must go with it which cannot be described with sufficient vividness to make the novice appreciate it. It has something to do with power and it passes along the lines between the animal and its master. As you sit behind the horse of true carriage action and conduct, you feel your proximity to a powerful mechanism that is undergoing a test of its minutest parts. If anything fails everything would be demolished, but it is the feeling of strength and power in the animal that allays unnecessary fears. Without leaving this feature connected with the carriage horse let us consider it in its relation to the trotter. Weight and strength in the carriage horse gives momentum to the occupants of the somewhat cumbersome carriage, while the trotter sacrifices these for speed and stamina. Between the trotter and its driver the feeling is that of flight instead of power in motion. The difference in the feeling resulting from watching the movement of these two classes of horses might be better expressed by reference to the difference in the feeling that one has when standing beside a swift turning wind-mill as compared with the effects of observing the turning of a ponderous water wheel. The former takes advantage of every

breath of wind and speeds a merry clip without apparent exertion of strength ; the other impresses one at once with its power and in a slower degree with its combination of strength and speed.

Action of the trotter. The leading feature of the action of the trotter is speed at the trotting gait. But there are many others that must be companions of this to result in the greatest development. Stamina or the ability to maintain that gait is necessary. It is generally thought that if a horse has speed he has the one essential necessary to make him a trotter or a good road horse. Any one familiar with horses acting in such a capacity knows that much more than this is required. Not only is speed desirable, but there must be the true balance of parts that ensures their protection, together with trueness of stride. Being true and level-gaited guarantees the greatest durability, and that with an ambitious turn of mind gives us that very desirable quality in the trotter termed gameness or stamina. Of all classes of action that of the trotter must not be wasteful of energy. While that of the carriage or high stepper must display effort, the trotter should move so as to leave the least impression of it. Less roll to the knee, more propulsion from the stifle and less motion in the hocks, carries the trotter forward closer to the ground and with less expenditure of force than the higher lifting of knee and hock which is characteristic of the high stepper. There is much more extension of the limbs, the fore legs are extended more and the hind legs are swung back farther and reach farther forward than in the action of the high stepper or carriage horse that must keep his legs well under him to gather himself together in a proper degree. A wider spread in the movement of the hind legs in the instance of the trotter is not as bad a fault as it is in the instance of the carriage horse.

The Market Qualities of Light Horses in Detail. Thus far we have considered the general market qualities of light horses in our large markets, clearly separating all the horses that come to it into several distinct general classes. In addition to these qualities there are numberless details of structure and soundness which more or less influence the value of the animals that are marketed. The most influential factor is undoubtedly that of soundness and the conformation that pre-disposes the animal to various diseases. To find ready sale for the horse of any of the types that have been described, it must not only be sound, but also show such strength of structure as to ward off the possibility of unsoundness. A badly constructed hock without the spavin may actually depreciate the value of the horse as much as a spavin on the well formed hock. The first does not have a spavin simply because it has never been put under a strain, while the spavin in the latter instant must have been due to a test of more than common severity. To discuss this feature of our subject in detail, it will be necessary to arrange the material that follows, so we may be able to go over the horse completely.

Head—Straight, Lean. The shape of the head and the countenance of a horse adds greatly to it appearance. The line from the ears to the point of the nose, as seen from the side, should be almost straight. In scanning the photographs of a great number of trotters it will be noticeable that nearly all stallions have slight Roman noses, while most of the mares have slightly dished faces. As a rule it will be found, that horses with very prominent Roman noses are strong-minded or self-willed. Small nostrils are generally associated with this form of nose, and as a consequence we find in such instances the respiratory or breathing organs lack development. The features of the face should be distinct without the least appearance of coarseness or meatiness. A lean face is suggestive of good quality in a horse. The muzzle should be fine to make the head appear at its best. Between the eyes there should be breadth enough to give a pleasing frankness to the countenance. It is a point of practical value as it is an index of brain development, which is of as much importance in a light horse, as intelligence is a merit that has a high valuation. While it is granted that the intelligence of a horse depends mostly upon the training received, yet, there is a marked difference in which horses will derive benefit from training, and that difference can be accounted for only by variations in the brain development.

Nostrils—Large, Open. The nostrils of a horse should be large, thin, dilatable and of a pink color. There should be no discharge from them, but they should have the appearance of being moist.

Eyes—Full, Clear. A bright eye indicates vigor of constitution, that is, stamina, staying power or bottom, as it is sometimes called. It is also associated with a happy disposition, and it is that which accounts for the fact that some horses do an enormous amount of work with little worry and strain upon hemselves. A large, full, clear eye is indicative of a kind, generous disposition.

Ears—Erect, Active. The ears should be carried in an erect position. They should be active and somewhat pointed. Lop ears denote lassitude, or in plainer words, laziness. When it is noticed that a horse does not shift or move either of his ears to any extent to catch sounds, it is safe to assume that deafness is present. On the other hand, if they are continually moving, it is advisable to look well to the eyesight, as the chances are that the extra labor imposed on the ears has its origin in a defect in one or both of the eyes.

Jaw Bones—Wide, Sharp. Between the jaw bones there should be sufficient width for the windpipe, and also enough to allow the head to play freely on the neck. When the space between the jaw bones is very narrow, it will often be noticed that the horse carries his head stiffly and in an awkward position, but when there is sufficient width in this region the head is carried freely and gracefully on the neck. The throttle and throat latch should be light, without any unnatural fulness between the jaw bones or heaviness at the juncture of the head and neck.

Neck—Arched, Muscled. A nicely moulded and distinctly chiselled neck carrying the head gracefully, is one of the most beautiful features of the ideal light horse. Running towards the shoulder, the neck should swell gradually, so as to join the body smoothly. The windpipe should be large and appear distinct from the rest of the neck, and the upper outline of the latter should be sharp. While the ewe neck is possessed by many excellent road horses, it is a defect, as it detracts from the appearance and should be noted as such.

Chest—Deep, Projecting. In the light horse that is called upon for fast work, the chest should be deep rather than broad. It should give room of capacity more by depth than by breadth. The reason for this is that the deep chest permits of freer play of the shoulder blades on the body. It is easy to see that swift, smooth action of the forelegs is hardly possible in the broad-chested horse, mainly because it throws them too far apart and out of line with those behind. A deep chest is an evidence of staying power. The conformation of such campaigners as Mary Marshall (2.12), Nancy Hanks (2.09), offers convincing proof of this.

Shoulders—Long, Oblique. The formation of the shoulder is one of the parts of all light horses that requires critical scanning. To give elasticity to the movement of saddle horses and to permit of quick and clean action in the roadster, the shoulder blade should be long and oblique. An upright shoulder gives a short, stilted action frequently accompanied by stumbling, and is a more or less fertile cause of such bone diseases as side-bones and ring-bones.

The high action which is desired in the coach or cob horse and the long reaching clean action so desirable in the roadster depend as much on the obliquity and freedom of movement of the shoulder as on any other feature. In addition, a sloping and long shoulder strengthens the back and extends the length of the underline. The muscular development of the shoulder should also be carefully noted, if there is an unusual bareness or lack of muscular covering it would denote the presence of sweeny.

Forelegs—Broad, Cordy. The appearance of the foreleg from the side shows it to be flat and cordy. The flatness, due to the tendons being properly attached, and the clean cut appearance denote the absence of any coarseness about the legs. In this region the leg should be long from the elbow to the knee, for the reason that free and clean action follows such a conformation. In these parts it will be noted that most of the muscle that extends and flexes the leg is located between the knee and the elbow. If this part

is long, the muscle must necessarily be long and that produces quick and easy action. The muscle of the fore arm flexes and extends the rest of the leg, and in order that these motions may place with the least expenditure of power, the course over which it must travel should be as short as possible; that is, the cannon running from the knee to the fetlock should be much shorter than the distance from the knee to the elbow.

Mr. H. T. Helm has made a careful study of the effect that the proportions of these parts to each other has upon the horse's action. He has measured a great many horses and finds that their action in the forelegs seems to be governed by the proportionate length of the arm and the cannon. He found that Administrator had superior action in front, and that his cannon was $11\frac{3}{4}$ inches long. and the forearm 21 inches. About the same proportions were found to exist in the forelegs of George Wilkes, and there was no lack of knee action in his movement. The actual proportions were $10\frac{1}{2}$ to 20 inches. In Governor Sprague, the cannon was 11 inches and the forearm 21 inches, and here the front action was not quite so rounding as that of George Wilkes. In the instance of St. Lawrence, the proportions were $11\frac{1}{4}$ to 21 inches, and the action was noticed to be far-reaching and gently curving. It can be easily understood that the strain upon the knees would be greater in those horses that were long in the cannons in comparison with the length of the forearm, and it will usually be found that such a conformation predisposes a horse to weak knees. On the other hand when the arm is inordinately long, the tendency is for the front legs to bend back at the knee and give rise to what is commonly termed calf-knees.

Arms—Short, Thrown Forward. The humerus which forms the arm should be short and appear comparatively straight. When it is so it gives a horse an upright appearance and adds to his style.

Elbows—Free. The space between the leg and the body should permit of easy insertion of the hand. If the elbow is closer than this or tied in, as it is termed, the toes are, as a rule, thrown out, or if the opposite is the case the toes are likely to be thrown in, which makes the progress of the horse awkward and dangerous.

Forearms—Wide, Muscled. Perhaps the most important matter to notice in examining the foreleg is the size of the forearm, or the bunch of muscle observable just below the juncture of the leg and the body. As fat accumulates but very little there, it is a safe criterion of the muscular development of the animal.

Knees—Wide, Deep, Straight. The knees should be broad in front, much broader than the rest of the leg, either above or below, and the pisiform bone, which is the bone forming the projection at the back of the knee, should be sharp and prominent, for to this some of the most important muscles of the foreleg are attached. Breadth is desirable in such joints, because of the fact that the concussion is more evenly distributed and better spent by the many bones forming the joint when their surfaces are large. The most common defects of the knee are cal-knees, knock-knees, knee-sprung, speedy cut and scars.

Cannons—Wide, Short, Large Sinews. There should be very little shrinkage below the knee as the joints require as much support as possible. This defect of being tied in below the knee is one of the most common weaknesses to be seen in the forelegs of light horses. A light horse of common size should measure at least 8 inches at this point. The cannon should be short, wide and clean and the sinews should be back from the bone. It is sometimes noticeable that the cannon is thicker than usual, which is generally caused by hard road work.

Pastern—Sloping, Strong. The pastern should stand at an angle of 45 degrees with the ground, and with the cannon it should form an angle of about 135 degrees. When more upright than this they will cause bone troubles, such as side bones and ring bones, as the concussion is very severe in such instances. Moreover, it detracts greatly from the utility of the light horse, especially those intended for the saddle, as the step is short and stilted, and this is very disagreeable to the rider. On the other hand sometimes the pasterns of light horses, and of thoroughbred horses especially, are too slanting, which weakens them and ultimately ends in the breaking of the suspensory ligament resulting in the horse "breaking down."

Feet—Dense, Waxy, Large. The foot should receive careful attention as it has an important part to play in the work of the horse, and is subject to many defects and various kinds of unsoundness. It should be of firm texture, good size, moderately upright and thoroughly sound. It should have a healthy appearance which is indicated by an oily coat of natural wax. The frog should bear the marks of natural usage as a buffer, being spongy and touching the ground at each step. The roof or sole of the hoof should be distinctly concave. Flatness, brittleness and contraction are the three most common defects in horses' feet. It will be noticed in many instances that the bar of the foot has been cut away, so that the hoof splits from the heel towards the coronet. This is due to the blacksmith's practice of cutting away the bars that bind the foot together behind. When this is done the foot begins to spread and the crack ultimately extends as far as it is possible for it to do so.

Ribs—Well Sprung, Deep, Close. The ribs should be well sprung from the spine and they should be close to each other. It will generally be found that those horses that have well-sprung ribs always make a better appearance than those that are flat ribbed; and, in addition, they will be found to be easier keepers. It should be noted that the round ribbed horse always has the appearance of being inordinately long in the legs. This deception is due to the roundness of his body. It can easily be seen that from a side view the flat ribbed horse presents a body of deeper appearance and seemingly has shorter legs than the horse that is rounder ribbed.

Back—Strong, Short, Muscled. In its proportions the body should be short above and long underneath. This not only adds to its strength, but it gives the legs free play and insures a balanced stride. The horse of this conformation under the saddle will unite himself more quickly and better, while the same horse on the line or in harness will have a long, sweeping, yet balanced stride. It is the opinion of many that the roach back is an evidence of strength. It is the most undesirable feature in a horse intended for the saddle, and it is to say the least an eyesore in road or in carriage horses.

Loin—Short, Broad, Muscled. It is a defect of many horses to be light and narrow at the juncture of the body and the hind quarter. If the loin is long or slack, that is if the distance is great between the last rib and the hip bone the horse is likely to be weak in the coupling and deficient in action, and when viewed from the side it will be noticed that the reach forward of the hind feet seems to step short before arriving at the place the other feet have left the ground. This probably is due more to the lack of muscle over the loin than to any other defect.

Hind Quarters—Croup Long, Thighs and Quarters Muscled. These parts should be critically examined, for, as it has been previously explained, it is in this region that the propelling power resided. The haunch or croup should be long, and for appearance sake should be comparatively straight. When the croup is long, it allows of a greater play of the main muscles that are located in this region. It will be noticed in nearly all fast trotters that the croup seems to have this characteristic. Length of muscle here as elsewhere contributes to speed.

The thigh should be plump with muscle and the quarters should be very strong. The muscle should not only be heavy in the quarters, but it should also extend as far down to the hocks as possible. The thigh should be long, making the hocks low, as this contributes to a long stride.

Hocks—Wide, Straight, Clean.—The hocks should be clean and broad, and the point should be prominent, as the leverage of some of the powerful muscles attached here depend to a great extent upon this. There should be no gumminess about the hocks or fetlocks. The support below should be strong, and in every feature the outline of the hock should be distinct. In running the hand over the hock, all the depressions that are characteristic of the sound hock should be easily felt, and the bone should feel firm, without the least indication of unsoundness in any part. The web of the hock should be especially clean and free from all fleshiness or puffs of any kind. Too much attention can hardly be shown to this joint—it being one of the most important in the whole frame.

It is necessary here to make a distinction between what are known as blemishes and unsoundness. A blemish is something that depreciates the value of the horse without actually interfering with his usefulness; such injuries as wire cuts, sprains, and other features, are blemishes, while unsoundness consists of spavins, curbs, ringbones, and all the other disorders that lessen the usefulness of a horse in his work.

In examining a horse for unsoundness, it is well to follow a regular order, beginning with the teeth. The best indication of decayed teeth, or any unsoundness in the mouth, is the odor which comes from it. If the outer edges of the incisors are broken off and worn away it is an indication that the horse is given to "cribbing" in the stable. The condition of the nostrils will indicate whether glanders or distemper is present. The nostrils should have a nice pink color, and no discharge should come from them. In regard to the eye, there many defects of vision which cannot be easily classified as unsoundness, yet they should be looked for as such. A horse by his action will usually indicate if his eyesight is good. He will step inordinately high and be inclined to shy readily if there is any defect in his vision. By moving the hand gently in front of the eye, blindness can usually be detected. The hand should be moved slowly, for if the motion is quick the influence of the air on the eye will induce the horse to shut his eye, though he may not have seen the motion of the hand. Defects of hearing are also common, and they can be foretold easily by the action of the ears. Rigid ears indicate that the hearing is defective. Passing to the shoulder, sometimes sweeny may be noticed. There is a shrinkage of the muscles which leaves the shoulder flat and bare. On the elbow, shoeboils, or capped elbow, will be seen frequently. The point of the elbow seems to be unduly enlarged by the accumulation of matter. Passing down the foreleg, splints should be looked for on the cannon. They may be found on all parts, but more care is necessary not to mistake the ends of the two small bones that are associated with the cannon for splint. In some horses the ends of these bones are surmounted with noticeable knobs. If these lumps are found on both of the legs in exactly the same place, it may be assumed that they are natural. When the splint is located on the back part of the leg, or close to the knee joint, so as to interfere with the action, it is in the worst possible place to have it. A small splint in a position of the leg where it is not likely to cause lameness, is not considered by most judges to be more than a blemish. The fact that splints on young horses very frequently disappear in a year or two should be sufficient reason for overlooking this defect when it is present in young animals. On the pastern ring-bone is sometimes to be found. This is easily discovered because of the lameness which it produces and the size to which it grows. Sidebones are sometimes found on light horses. By pressing the thumb and fore finger around the hind quarter of the front foot this disease may be detected easily. Little hard prominences may be found on the side of the pastern just above the foot. They are formed of cartilage and afterwards become ossified, causing pain and frequently lameness. Sidebones, or the formation of foot producing them, are considered hereditary. The foot, itself, is subject to many forms of unsoundness. Looking at it from above, the presence of quarter crack and sand-crack are sometimes seen, and these are bad defects. On the under side of the foot there should be no splints in the hoof running from the bars to the top of the foot. This is a very common form of unsoundness in the feet. Corns, which are located in the corners of the heels, are also quite common, and may be more or less indicated by the way a horse will shrink when the hoof is hit with the handle of a knife in that part Thrush and scratches are not common, and when they are present it is very easy to detect them. Lameness in the fore limbs is easily foretold by the action. In locating lameness in the leg, it should be borne in mind that it is the sound limb that the horse puts down with the most confidence, and when the ailing leg comes to the ground, he makes an effort to ease it by throwing his head up. In locating lameness it should be remembered that when a horse shows lameness in front, if the trouble is in his shoulder he will usually flex the leg at the knee when he is standing at ease. When the sprain or lameness is below the knee he will extend the defective limb from the body. When he is sore on both front feet he will extend them as far as possible.

In the hind limbs the hocks should be carefully inspected. In detecting diseases in this region, it is absolutely necessary to know first the outlines of a perfect hock. With that in mind, it is a very easy matter to detect any of the many unsoundnesses that occur in this region. Thoroughpin is located between the tendon of the hind leg and the bone, and it fills the depression, which naturally occurs just above the hock. It consists of a soft swelling which may be pushed from side to side. Curb, which occurs just below the hock, and to the rear, is a thickening of the ligaments in that region. By looking at the leg from the side it may be noticed easily, as it is a deviation from the straight line which should follow from the point of the hock down towards the end of the cannon. The most common trouble of the hocks, and the worst one of all is bone spavin. To detect this, it is best to stand in front of the horse and look back between his fore legs if necessary, so that the inner outline of the hind leg may be seen very clearly. This is a bony deposit which nature has thrown out to strengthen the weak joints, and when it has developed, it ties up the joint so that it interferes with the proper action of the horse. The hind leg instead of coming down on the heel as it should in a sound limb, is thrown forward so that the toe reaches the ground first, and the stride is unnaturally shortened, and lameness frequently results. Bog spavin is usually associated with thoroughpin, though it differs in location. In the natural depression which occurs on the inner and front of the hock, the oil from the joints seems to accumulate and form a soft swelling which is commonly known as bog spavin. Splints sometimes occur on the hind legs but they are exceptional, while sidebones are only found in front and ring bones on both front and behind limbs.

After giving all the parts careful inspection for soundness, the horse should be driven rapidly a quarter of a mile or so to try his wind. He should be stopped short, and as he stops advance close to his neck and notice if the breathing is free from any sound similar to whistling. If the breathing is accompanied by a wheezing or whistling sound then whistling, roaring, or some disorder of the air passages is present. If there is any doubt as to the origin of the sound—it might possibly be due to a very tight collar, in such a case, have the horse taken out of harness and ridden rapidly. When the breathing is not regular, it is likely that the horse is troubled with the heaves. In the instance of horses so afflicted the breathing is more or less spasmodic ; the air from the lungs seeming to be half expelled when the respiration stops for a brief period, and then the expulsion of the air is continued. In this way, the depression at the flanks is not gradual and continuous as it is in the instance of a horse with sound lungs, but it is stayed for a short period when the breath is about half expelled from the lungs. In the sale ring defects of the wind are never over-looked by purchasers.

Scale of Points for Gelding. The score card which is appended has been used during the last five years to assist me in imparting to our students a knowledge of the relative importance of the different regions of the horse, and also to drill them in observing carefully and systematically the various points. It is not suggested for the use of judges in the show ring, for there it would prove a source of delay, but for the use of students and classes it is invaluable, for it develops the student's powers of observation in a careful and systematic manner and strengthens his judgment in a practical direction. It is here presented to show in a clear and condensed form the relative importance of the parts that have been discussed in detail elsewhere.

UNIVERSITY OF WISCONSIN.

DEPARTMENT OF AGRICULTURE.

Student's Score Card No. 1.

LIGHT HORSES.

SCALE OF POINTS.	Perfect Score.	Points Deficien	
		Stud's Score.	Corrected.
A. AGE			
B. GENERAL APPEARANCE:			
Weight, ... lbs.; actual			
Height, 16 hands; estimated hands..... actual	2		
Form, type..... symmetrical, smooth, stylish	4		
Quality, bone clean, firm; tendons, defined; hair and skin fine	4		
Action, step smooth, long, active; trot rapid, straight, regular	20		
Temperament, active, good disposition	3		
C. HEAD AND NECK:			
Head, lean, straight	1		
Muzzle, fine, nostril large; lips thin, even; teeth sound	1		
Eyes, full, bright, clear, large	1		
Forehead, broad, full	1		
Ears, medium size, pointed; well carried	1		
Neck, muscled; crest high; throatlatch fine; wind-pipe large	2		
D. FOREQUARTERS:			
Shoulder, long, smooth, oblique, extending into back	3		
Arm, short, thrown forward	1		
Forearm, muscled, long, wide	2		
Knees, clean, wide, straight, deep, strongly supported	2		
Cannons, short, wide; sinews, large, set back	2		
Fetlocks, wide, straight	1		
Pasterns, strong, angle with ground 45	2		
Feet, medium, even size; horn dense; frog large; bars strong; sole concave; heel wide, high	6		
E. BODY:			
Withers, muscled	1		
Chest, deep, low, large girth	2		
Ribs, long, sprung, close	2		
Back, straight, short, broad, muscled	2		
Loins, wide, short, thick	2		
Underline, long, flank let down	1		
F. HINDQUARTERS:			
Hips, smooth wide, level	2		
Croup, long, wide, muscular	2		
Tail, attached high, well carried	1		
Thighs, long, muscular, spread, open angled	2		
Quarters, heavily muscled, deep	3		
Gaskins or lower thighs, long, wide, muscular	2		
Hocks, clearly defined, wide, straight	8		
Cannons, short, wide: sinews large, set back	2		
Fetlocks, wide, straight	1		
Pasterns, strong, sloping	2		
Feet, medium, even size; horn dense; frog large, elastic; bars, strong; sole, concave; heels, wide, high	6		

THE AMERICAN AND CANADIAN CLYDESDALE BREEDER COMPARED.

By Alexander Galbraith, Janesville, Wis., Secretary of the American Clydesdale Association.

It is instructive to glance back through the earliest volumes of the Clydesdale Stud Book and observe who the men were who were instrumental in laying the foundation of the Clydesdale breed on this continent. It will be seen that for many years before he was recognized as a prominent and permanent feature in American farm life, the Clydesdale horse was scattered over a great portion of Canada and had obtained a sure footing in the Dominion, but more particularly throughout the Province of Ontario. Those early pioneers were alike hardy and enterprising, far-seeing and patriotic. They performed a noble work amid many obstacles and difficulties, and the benefits derived from their respective communities was great and lasting. Whatever faith in the future of the breed those enterprising importers and breeders may have had, and it may be safely assumed that confidence in their favorite breed was not lacking, it is impossible they could have forecast the present time when at almost every farm homestead throughout the Province of Ontario, and to a less extent perhaps throughout the other provinces as well, the Clydesdale horse is recognized as a *sine qua non*, an integral portion in fact, of the Canadian farmer's stock in trade, and this to the practical exclusion of all other draught breeds.

We have in the United States probably more Clydesdales now than there are in Canada, and—American like—we have several breeders each of greater magnitude than any half dozen in Canada put together, but withal there is not in the States the same unanimity of opinion regarding the comparative merits of the various draught breeds, nor the same steadfast, persistent determination to breed Clydesdales in good times and bad times, through good and evil report, that is everywhere evidenced in Ontario. The reasons are, of course, that we have a great variety of nationalities in the States who are not tied so the breed by any patriotic feeling and while the average American farmer is undoubtedly full of resource, versatile and enterprising, he is correspondingly fickle and changeable and altogether too anxious to try something new all the time. So long as things go smoothly and profitably, good and well; when they don't he is ready to let go without notice or compunction. The American farmer is ever ready to abandon stock raising and try his hand at raising tobacco or sugar beets, or something else he knows nothing about. I remember hearing of one farmer who gave up raising cattle in order to raise carp fish. The latter were probably more congenial companions, although I fear he would soon find himself in "deeper water" than ever. Another trouble with Americans is that they are not as a rule close studious horse judges like their cousins over the line. Each man has his ideas and peculiar notions perhaps, but these are not founded on any recognized law of scientific breeding or value or utility. Hence it is that when two or more American farmers are asked to adjudicate in a Clydesdale ring for instance, they very rarely agree in their awards, their ideas being so widely apart. But reverting to the peculiar characteristic of fickleness or desire for change, it is not surprising that during the last few years of depression in the horse markets, our American farmers should have lost entire confidence in the business and have virtually abandoned the raising of all kinds of horses. Reason with them as you will it has hitherto been impossible to convince any considerable number that the present is the most opportune time that has ever occurred, so far as human probabilities go, for breeding good heavy draught and stylish coach horses. They simply will not listen to any argument on the subject, or if they do assent they won't act. Nothing short of a very substantial all round advance in prices will open their eyes. That there has already been some advance no one will gainsay, but so far any marked improvement in prices has been speedily followed by an enormous increase in the volume of receipts with the natural result of checking further advances. It becomes therefore a simple question of sup-

ply and demand. The receipts at Chicago during the first five months of the present year were simply stupendous, but since June 1st they have been correspondingly low, and will so continue probably till the end of August. Prospectively the receipts will ebb and flow according to the season and the demand, but they must inevitably get permanently smaller and of poorer quality after next spring, as the results of the curtailed breeding since 1893 make themselves generally felt.

With the same existing depression in Canada and the United States, however, it is interesting to make a comparison between the action of the two classes of farmers. Making all allowance for exceptional cases, of course, the Canadians, as a class, are not in a political but commercial sense conservative in their actions, but nevertheless distinctly rational. They do not allow prejudice or disappointments to warp their judgment or paralyze their line of work. In good times they go at a slower, safer pace than the Americans; in dull times they naturally slacken speed, but, unlike their American friends, they don't stop. In this lies perhaps the chief difference between the two. The Canadian acts unconsciously on the advice tendered by Bailie Nicol Jarvie in Rob Roy, "Never stretch your arm further out than you can safely and comfortably draw i back again." This, judiciously combined with enterprise and energy is their commercial salvation, but to the average ambitious American it has no attractions whatever. The latter's mind is ever active trying to discover a short cut to prosperity, and occasionally his inventive brain and speculative mind enable him to land "right side up." Should he not succeed in one enterprise or line of action he tries another. Originality and inventiveness are his strong points—love of change for the mere sake of change is the accompanying, perhaps the consequent weakness. The Canadian's native conservatism may sometimes prevent his sailing out on the high tide which we are assured leads on to fortune if taken at the proper time, but it also deters him from venturing out when the commercial sky is overcast or the business rocks and shallows are dangerously near. The American's nature and practice undoubtedly help to bring around those periodic spells of stagnation and prosperity, something in fact resembling the seven lean years and seven fat years of Jacob's time. As a nation they are free spenders when times are good, and this fact naturally facilitates and increases the prosperity of the merchant class. The average Briton or German or Scandinavian is much more cautious in his purchases in flush times than the native American, with the result that when tight times like the present come he is apt to be in better financial condition, having something saved to fall back upon. Now the question arises, and it is perhaps in some measure applicable to the Canadian as well as the American farmer, will the stern experience of the last few years be thrown away, or have the people learned a lesson in economy since 1893? In all probability the present generation will profit by the experience of the past, but so far as the Americans are concerned their natural sanguine instincts will soon again assert themselves, and when good times come in sight they will be free investors and will doubtless boom whatever department of farming or stock raising appears to offer for the time being the most profitable returns.

DAIRY DEPARTMENT.

THE RELATIVE VALUE OF MILKS FOR CHEESEMAKERS.

By H. H. Dean, B.S.A., Professor of Dairy Husbandry, Ontario Agricultural College, Guelph, Ont.

The majority of our factories will continue to divide the money among patrons according to the weight of milk delivered, regardless of whether the milk is normal or cow milk, or whether it has been watered or skimmed, whether it be rich or poor or medium in butter fat and casein, the chief cheese producing compounds of milk. At the Tavistock factory in May, 1895, the milk delivered by the patrons varied in the fat from 2.8 to 3.8 per cent. In October the variation was from 2.8 to 4.9 per cent. of fat. At the Oxford Mills factory the variation in May, was from 3 to 3.8 per cent. of fat and in October from 3.4 to 4.4 per cent. of fat. One hundred pounds of 2.8 per cent. milk will make about 8½ pounds of cheese, while 100 pounds of 4.9 per cent milk would make about 11½ pounds of cheese. If the former factory distributed proceeds according to the weight of milk delivered, the patron with 4.9 per cent. milk would lose 1½ pounds of cheese or about 12 cents per 100 pounds of milk. But they do not conduct business in that style at this factory. All the milk is tested and the proceeds divided according to the per cent. of fat plus two (which represents the casein) and thus each patron is rewarded according to his labor.

Some leading dairymen and scientists are of the opinion that the butter fat of milk alone determines its value for cheesemaking. The writer considers that "pooling" according to the butter fat only, places too great a premium on the fat. The casein ought also to be considered. This is most easily done by assuming that the casein of the milk incorporated in the cheese is represented by the addend "two" in connection with the fat.

A leading American dairy chemist says regarding the fat system or "relative value plan": "Although the relative value plan as now practised is a very great improvement over the pooling system, it does not do strict justice to all patrons even when the better quality of cheese from the richer milks is considered." He further adds: "The perfect system of making dividends in cheese factories must include not only the amount, but also the relative value of fat and the other cheese producing solids. . . . The relative commercial value of these solids may be obtained by comparing the market prices of full cream cheese and skim milk cheese. At present full cream cheese is selling for 8.5 cents per pound, and cheese from separator skim milk for not more than 2 cents per pound." From this premise in connection with certain formulas he constructs a table showing the relative value of milk containing different percentages of fat and having a certain lactometer reading. Happily we are free from the curse of skim milk cheese and this argument has little or no bearing upon the Canadian system of manufacturing cheese or paying patrons, but for the sake of argument we may examine this latest system of determining the relative value of milks for cheesemaking purposes. It is an old axiom that you cannot compare things which differ, and skim milk cheese is as different from normal milk cheese as pure butter is different from oleomargarine. In the second place, I doubt if skim milk cheese can be made for 2 cents a pound. It costs in Ontario, from 1 to 2½ cents per pound to haul the milk and manufacture whole milk cheese. Assuming that separator skim milk is worth 15 cents per 100 pounds, (Prof. Henry values it for hogs at from 11 cents to 19 cents per 100 pounds) and that it makes 6 pounds of cheese, this would be 2.5 cents for the cost of the milk alone to make one pound of skim milk cheese. Add to this the cost of making, which is not far from three quarter cents per

pound, and we have the cost of a pound of skim milk cheese at 3.25 cents and still unsold. Add to this the cost of marketing and we can easily see that selling skim milk cheese at 2 cents per pound is a losing business. Either 2 cents per pound does not represent the average selling price of skim milk cheese, or else our American makers of skim milk cheese are bigger fools than we in Canada ever gave them credit for.

We would urge upon all factory managers the importance of testing the milk to determine its relative value, and call their attention to the fact that there is a wide difference in the value of milk per 100 pounds for cheesemaking purposes. The man who "pools" 4 per cent. milk with a neighbor who delivers 3 per cent. milk, on the basis of weight of milk, loses 6 cents per 100 pounds of milk, or $3.00 per 5000 pounds of milk, or $30 on the milk of ten cows, in a season. He feeds, cares for and milks one cow out of ten for the benefit of his neighbor.

WINTER DAIRYING.

By Prof. H. H. Dean, O. A. C., Guelph.

The following extract from a letter of a leading Institute worker fairly describes the position of many farmers in reference to the winter dairy: "Many of our buttermakers are almost professionals in the summer, but in the winter we are almost beaten —sometimes we have to churn nearly all day, and then if the butter does come, it is of very poor quality. The cream gets bitter and I do not like the butter myself. I feel ashamed to offer it on the market. Many others are in the same fix. Dairying all the year round has been strongly recommended at our meetings, but how to handle the cream and make the butter has been neglected." To meet these difficulties is the object of this paper. I will say at the beginning that it is difficult to tell another on paper how to do a practical operation such as churning. The most satisfactory way is to *do the work* under the guidance of a skilful operator. The hand then becomes the servant of the trained mind and good results follow. To obtain this training I know of nothing better than the opportunities offered at our dairy schools. The Provincial school at Guelph will open January 4th, 1898, for both factory and home dairy classes. The home dairy course will be specially suitable for workers in the farm dairy. A lady instructor will be placed on the staff so that farmers' wives and daughters may feel more freedom in attending. Special instruction will be given to the Home Dairy Class in poultry farming. The expense will be nothing but railway fare, and board which costs from $2.50 to $3.00 per week. However, if you cannot attend the dairy school, you may be able to obtain some useful hints in the various publications sent to the members of the Farmers' Institutes.

The average farmer of Ontario finds himself in about the following position: *Expenses which must be met all the year round; income but half the year.* Can this be improved upon? Yes, by a proper use of the winter dairy. There are two methods of conducting the winter dairy business—creamery and private dairy. We have no hesitation in recommending the creamery to all winter dairymen wherever it is at all practicable. It is not practicable in places where it is impossible to obtain at least 5000 lbs. of milk every other day for four to six months. This milk should be obtained within a radius of five miles from the creamery. The main advantages of the creamery are:

1. A better and more uniform quality of butter can be made.

2. All the butter is got from the milk, whereas by setting the milk, nearly one-quarter of the cream is lost.

3. The skim-milk may be returned to the farm in a warm, sweet condition.

4. More money is obtained for the labor and feed given to the cows.

The extra butter got from the milk by means of the separator will nearly, if not quite, pay the cost of manufacturing (which is usually 3c. per lb. of butter) The extra price obtained for creamery butter will leave a handsome profit on the winter's work. The extra quality of skim-milk will about pay for hauling. The labor saved at the farm house will add to the peace and comfort of the home.

Winter Butter Making in the Private Dairy.

Whether the winter dairy be private or co-operative, there is need of a certain number of fresh cows, which enable the maker to cream the milk easier and to get the butter with less trouble. There is also more profit in feeding fresh cows than "strippers." The feed should be of a succulent or juicy nature. Mangels or carrots or silage are all good for a winter flow of milk. We feed at the dairy stables of the Ontario Agricultural College both mangels and silage. Swede turnips should not be fed if a fine quality of butter is desired To make a success of the winter dairy the cows and stables should be kept clean. The hind quarters, udder and tails should be clipped in the fall. Use plenty of bedding under the cows. Sawdust makes excellent bedding and keeps the stalls and cows cleaner than straw unless it is cut. The udder should be brushed before commencing to milk. The milk should then be strained and either be set in pans or deep pails, or creamers, or be run through a separator. If 10 to 20 cows are milked it will pay to use a cream separator. This separator may be put in a convenient place at or in the stable, and be run with tread power furnished by horse or bull.

Shallow pan setting needs much space, pure air, a moderate to cool temperature, and skimming at from 24 to 48 hours—before the milk becomes thick.

For deep setting it is important to cool the milk to a temperature of 45° or below, before skimming. Skim at the end of 24 to 36 hours in winter. The cans may be submerged, or surrounded by water as high as the milk in the cans. They may be skimmed from top or bottom. Where the separator is used, have the temperature of the milk from 85° to 95°, the speed of the machine full and constant, and the feed regular. Test the skim milk and note if there is any loss of fat. Secure the cream quite thick, and cool immediately to about 50°. Keep all cream at about this temperature until sufficient is obtained for churning, then warm to ripening temperature by means of a water bath. Stir the cream while it is being warmed by the use of a tin stirrer. Heating the cream to 160° F. for 20 minutes is a good plan in winter as it drives off stable and feed flavors. Use a "starter" to ripen the cream.

Ripening Cream. The ripening temperature will vary with the seasons, cows and kind of cream. The temperature should be such that the cream will ripen in 24 hours with or without a "starter." A "starter" may be made by heating some skim milk from a fresh cow to 90° the day before the cream is to be set to ripen. Throw away the top portion of the thick skim milk and add to the cream from 2 to 10 per cent. of the finely broken starter. Stir it well into the cream, and leave it undisturbed until 20 or 24 hours after, when it should be ready to churn. The buttermilk may be used for "starter" so long as it is of good flavor. Give the cream a good stirring before putting it in the churn.

Churning. A simple box or barrel churn we find to be the best. To prepare it for churning, first scald and then cool. Strain the cream into the churn and it will prevent white specks in the butter. If coloring is used, it should be put in the cream before commencing to churn. The churning temperature will vary a great deal. Thick separator cream may be churned at 50°. Thinner cream may be churned at 56° to 60° in summer, and higher up to 70° as the season advances. Have the temperature such that the butter will come "firm" in from 20 to 40 minutes. Close covered churns must be ventilated two or three times during the first ten minutes of churning. When the butter "breaks", add a quart or more of water to the churning for each pail of cream. The temperature of the water added at this stage should be varied according to season—

cold in hot weather and warmer in cool weather. The object is to assist separation of butter from the buttermilk, and to temper the granules of butter. If the water is too cold in winter, it will prevent the grains from forming the proper size. The churn should be stopped when the grains of butter are about the size of small wheat kernels. The buttermilk may then be drawn off through a strainer, or the granular butter may be dipped out of the buttermilk by means of a sieve, which is the Danish practice.

Why Butter Does Not Come. The chief reasons are:

1. The temperature is not right—usually the cream is too cold in the churn.
2. The cream may have been kept too long.
3. The cream of a "farrow" or "stripper" cow may be causing the trouble.
4. The cream may be too thin—get rid of some of the skim milk.
5. The cream may be too thick—add a little skim milk or water.
6. The churn is too full.
7. The maker is incompetent.

The process of churning is the packing together of tiny fat globules, and anything which hinders this tends to prevent churning.

Washing Butter. Where a highly-flavored, short keeping butter is wanted do not wash at all. For prints to be eaten in a week or two, wash once, and for tub butter, to insure keeping quality, washing twice or until the water comes away "clear," is a safer practice. Do not leave the butter standing too long in the water as it will spoil the flavor.

Salting and Working. Fine butter salt (the use of coarse, lumpy salt is not advisable) at the rate of $\frac{1}{2}$ ounce to 1 ounce to the pound of butter may be sprinkled on the granular butter in the churn or on the worker. (Some salt with strong brine). If salted in the churn a portion or all of the working may be done by revolving the churn slowly after allowing the salt time to dissolve. Expert butter-makers may work butter once. Others will succeed better by working twice. Work by pressure and avoid a sliding or grinding motion. When the "streaks" have disappeared, and the butter is firm and waxy in texture, and the excessive moisture is removed, it is then worked sufficiently.

Printing and Packing. For immediate use the "print" of various sizes is a desirable package. It should be wrapped in good parchment butter paper. The square package lined with paraffine wax is best to pack butter in for export. The butter should be solidly packed in the box, then be covered with butter cloth or parchment paper.

Marketing. Do not trade butter for dry goods and groceries at (for you) starvation rates of exchange. If possible secure customers in a village, town or city and send them your best make regularly. Selling to a reliable commission house or groceryman (for cash) is a good way to market. Have a brand for your butter and sell none but the best with your brand on it. If a churning goes wrong sell it for what it is worth and not on account of its reputation.

CARE OF DAIRY UTENSILS.

By T. C. Rogers, Instructer in Buttermaking, O. A. C., Guelph.

Cleanliness is the virtue that is always in demand in the care of dairy utensils. Certain appliances and conveniences are necessary in order to aid the dairyman or the one engaged in practical dairy work to keep everything clean and in good condition without waste of labor. Any person engaged in dairy work knows how difficult it is to keep everything neat and clean in the dairy at all times, even when everything is favorable for

doing so; but what must the work be like in the dairy when the supply of hot water is insufficient, and where no brushes, washing sink or other conveniences for doing the work quickly and well are to be had. A good supply of hot water (and steam in large dairies) washing soda, suitable brushes and a washing sink, are necessary in every dairy or creamery. The hot water supply should be arranged so as to save fuel and labor. The supply should be equal to the demand. A washing sink made after the following plan will be found very convenient and useful. Length 30 inches, width 18 inches, depth at the sides 10 inches, sloping down and in from the sides until the sink is 15 inches deep in the centre, and 6 inches wide at the bottom, with a gate tap at one end. Less water will be required with a bottom like this than if it is flat. A smaller sink would be suitable for small dairies. It is light, easy to handle, movable, can be placed wherever most needed and would be a useful appliance in every farm home. The inside of this sink should be made of heavy tin or galvanized iron and the outside of wood, with legs long enough to make the top of the sink 36 inches high.

Washing. The sooner dairy utensils are washed after using, the more easily they will be cleaned When ready for washing up, gather all the dirty pails, cans and other utensils around, and put a pail of warm water (not too hot for the hands) and a teaspoonful of washing soda into the sink. The washing soda will take off the grease quicker and help to keep the tins brighter. If the tin is rubbed hard with the cloth or brush each time they are washed, they will keep bright and less scouring will be required to keep them looking well. Then with a cloth or brush wash all parts of the tins thoroughly, being particular about the seams and corners. The seams in all tinware made for use in the dairy should be filled with solder to prevent the accumulation of dirt where it is difficult to remove with a cloth or brush. As each utensil is washed, turn it upside down to drain. When all are washed in the first water, empty the water and rinse out with a little hot water, then put in sufficient boiling water to scald all the utensils thoroughly; this will remove all taints. Turn them upside down again to drain for a few minutes. Never use the dishcloth to dry tinware used for handling milk. Then lay them on their sides while the tin is hot, on a table or shelf in a clean well ventilated room, or better outside in the light of the sun, where they are surrounded by plenty of fresh air. The shelf should be made with a little incline so as to drain the cans and pails, also to prevent rain or dust from falling into them. I prefer steaming the cans after they are rinsed in the hot water, if convenient to do so. Some steam the cans after they are washed, without rinsing in the hot water, but I do not like this way, as I have seen some very unclean looking utensils after being so treated. Rinsing in clean hot water after washing removes the possibility of white spot drying on the surface of the tin. The chief points to observe in the cleaning of dairy utensils is to wash clean, drain properly and place in such a position that they can get plenty of fresh air. It is a bad practice to turn pails or cans upside down while not in use, as they are more liable to rust and they generally smell foul when needed, even after they have been cleaned properly. Better lay them on their sides. Hang all dippers, strainers and small utensils in order in a convenient place. Have a place for everything and have everything in its place. Before emptying the water that the tins were scalded in, wash the dishcloth clean, wring it dry and spread so that it will come in contact with fresh air. I prefer the brush for general cleaning. Two or three dishcloths should be kept on hand, so that a clean one will always be ready when needed. Use soap to cleanse them, and never leave a cloth without spreading it out in the air or it will be unfit for use in dairy work. Have some cotton waste to wipe up any waste oil about the machines, and do not use the cloth that is used in washing the milk cans for this purpose. Two or three strainer cloths should be kept on hand for straining milk. They should be washed in two waters, then scalded in boiling water and spread on a line outside in the light of the sun. In some cheese and butter factories they boil the strainer cloth for twenty minutes. This is wise, as the strainer cloth is a source of trouble many times; and is very difficult to clean so as to destroy bacteria or germs that may cause bad flavors in the milk. Serious trouble in the flavor of cheese in some factories has been traced to the strainer cloth through which the milk was strained as it entered the vats. Some of our best cheese makers won't allow their patrons to use

cloth strainers, as they know how difficult they are to clean. They are all right if kept clean, but I know from experience that it takes more time, patience, perseverance and hot water to clean them than they will receive in most dairies. A wire strainer with one hundred meshes to the inch would be more suitable in most dairies.

Churns. It is important to keep the churn sweet and clean, so that the flavor of the butter will not be tainted while churning. After you are through churning and making the butter, rinse down the inside of the churn with a little hot water and allow it to run out at once, to remove any butter that may be sticking to the sides of the churn. Then put in some warm water and use a cloth or brush to clean it properly. Then scald it with as hot water as can be got, and repeat the scalding a second time with hot brine. Then remove the lid, draw the plug, and allow the churn to get all the fresh air possible. I scour the inside of the churn occasionally with salt. Do not cool the churn with cold water as it will not dry so quick, and would encourage mould if left standing in a damp room. Wipe the outside of the churn with a clean cloth to remove any drops of cream or milk that may be on it. If the churn is not used every day and the room is warm, it is better to put it in a clean cellar after it is perfectly dry, to prevent it from shrinking, or it may leak the cream when used again. If the churn is steamed for ten minutes after it is scalded with the hot water, it will keep in a better condition, as the steam is hotter and will penetrate corners and cracks where the hot water fails to clean out. In ten minutes after steaming remove the lid. When using it again, rinse out with hot water and cool with cold water before putting in the cream. A coat of varnish once a year will keep the churn nice looking. White spots on varnished appliances can generally be removed by rubbing hard with a piece of oily waste or cloth.

Butter Worker. Butter spades and printers. Before using any wooden utensil that comes in contact with the butter, it should first be scalded with hot water and then cooled with cold water, to prevent the butter from sticking. A quick and easy way to prepare a worker is to take a dipperful of hot water and use a brush to scrub it. The brush causes the water to penetrate the wood better and less hot water is required, as the one dipperful is all that is needed even in hot weather, when it is sometimes difficult to prevent the butter from sticking; and less cold water is needed to cool the worker properly for the butter. A good way to clean wooden utensils and keep them sweet is to scour them with salt after the wood is wet. It also helps to prevent the butter from sticking. The printer and butter-spade should be soaked first in hot water and then in cold water for some time before they are used. After printing the butter, use plenty of hot water and a brush to clean them properly, and rinse off with more hot water after using the brush. Hang up the printer and butter spade and wipe the outside and legs of the butter-worker with a cloth.

Salt Sieve and Scale. The salt seive should always be kept dry for sifting the salt, but always rinsed in hot water immediately after it is used, to remove the salt and thus prevent moisture accumulating on the hair seive; rust is also prevented in damp weather. The perforated tin bottom seive is more serviceable. The scale requires care to prevent it from rusting, and should be cleaned after using and put in a dry, warm place when not in use, especially in cheese or butter factories. It should also be wiped over occasionally outside and inside with an oily cloth.

Babcock Tester and Cream Separator. The Babcock tester should be painted inside and outside with brown paint. A coat of varnish on the outside over the paint will make it look better. After using the machine, wipe it dry to prevent rust. A little paint and varnish applied once in two years or oftener, would keep the dairy appliances attractive and more pleasing to the eye, and preserve them from rust. Proper methods of cleaning the separator should be studied so as to keep it in good condition and to prevent it from rusting. After all the parts are thoroughly washed and scalded, they should be placed in a position to drain dry while hot, and should never be put together until perfectly dry. If the parts are put together again while wet, it will only be a short time until the machine will be rusty and old in appearance. The frame of the machine should be wiped with an oily piece of waste or cloth after using it. It should be set level, run carefully,

and oiled properly with the best of oil, so as to avoid unnecessary wear and tear. As the care of dairy utensils and appliances is a matter of very great importance in the dairy business, I have in this paper endeavored to show how to do the work as I practice and teach, in a way that I trust will be helpful to those engaged in practical dairy work.

THE SUCCESSFUL AND THE POOR DAIRYMEN COMPARED.

By W. C. Shearer, Bright.

The Poor Dairyman. In breeding or rearing his herd he does not go to much trouble or expense; he usually uses a grade sire of no particular breeding; he generally buys him at some sale when things are selling cheap; he raises four or five heifer calves from him each year; they are small, stunted little things the first summer and never seem to get over this first setback. When these heifers become cows, here is their usage: He has them due to calve in May and June; they have been poorly fed all winter on straw and turnips, with lots of exercise; as soon as any signs of grass appear, they are turned out on the roadside till their own pasture gets a little start; they milk fairly well through the month of June, as long as there is good growth. He does not sow any soiling crops, and when the drouth of mid-summer strikes them, "they shrink in milk, wonderfully." If it happens to be a moist, wet season, the grass keeps green and growing fresh. He thinks, I'm all right this year; for the cattle can take care of themselves and give considerable milk, too; but in a season like some we have had lately, when the drouth continues throughout harvest and well along into the fall, his cows become very thin in flesh, and nearly go dry altogether. But to liven them up a little, he keeps a splendid dog, and they are always brought up to be milked with the inspiring aid of that lively animal. If you ask him how much milk this or that cow gives, his answer is, "O, not very much; I never weigh each one's milk separately and have too many colts and horses, and they keep the grass rather close for the cows to get much. I've made a mistake, too, last spring in not sowing something for green feed in case of a dry spell. I expected we would have a showery season, as the last two or three seasons have been too dry for anything to grow; but I guess I've got caught in the same fix again." He keeps 10 cows and supplies his milk to the cheese factory. They have averaged 2 700 lbs. of milk each, and which brought $22 apiece from the factory. They made some butter to trade at the store, before and after the season, which would with the cheese money amount to about $26 00 each for the whole year. He keeps two breeding sows and always sells the little pigs when weaned. He does not believe in fattening pigs, for he is sure that on the whole they eat more than they are worth. These sows have two litters in a year each; the fall ones he sells at about $1 25 each, and the spring litters at $2.00 each; he also has half a dozen breeding ewes, from which he averages from 8 to 10 lambs. His returns account stands about like this:—

Feed for his cattle.	
15 tons hay @ $8 per ton	$120
10 " straw @ $2 50 per ton	25
1100 bushel turnips @ .05 cents	55
Oats and peas	100
	$300

Income from his cattle.	
10 cows @ $26	$260
16 fall pigs @ $1.25	20
12 spring pigs @ $2.00	24
10 lambs @ $3 00	30
100 bushels wheat @ .75	75
Fat ewes and 2 year olds sold	90
	$500
	300
Profit	$200

The Good Dairyman. Some points in breeding and rearing a good dairy herd.

He keeps a good sire at the head of his herd; one that has been bred from a large and deep milking cow. Has been using Shorthorn sires till two years ago; he is now

using a Holstein sire, bred from a heavy milker and also a grand butter producer. His practice is to have the cows he desires to raise heifers from calve between January and May. He raises these calves on milk, pulped roots and hay with some bran and ground oats, and aims to keep them growing fast right along, and never on any account to let them get stunted, knowing that on the good and thrifty condition of the heifer depends in a great measure the future cow, whether she turn out a profitable or an unprofitable one. Having got these fine, strong, healthy young heifers to become mothers at two years old, he attends to them very carefully and feeds them an abundance of rich, succulent and milk producing food. In order to provide this food for his cows he at two or three times, a week apart, sows a mixture of peas and oats, one part peas to two of oats, and about May 15th, or as soon as it seems safe from frost, he sows an acre or two of corn for soiling. He starts to feed it when the oats and peas get too ripe, always endeavoring to keep up the cows to a full flow of milk, right through the dry hot weather of harvest. He sows plenty of corn to keep up all the choice succulent feed the cows require, which, with the after growth on hay and stubble fields, furnish an abundance of feed right on till October. He begins to keep them in as soon as the nights are cold, because he finds that cold, stormy or wet weather reduces the yield of milk very quickly, and it is more difficult to regain than it is to keep it up, for with a little care at the right time this loss from shrinkage can be very greatly helped. He keeps five brood sows and has them have pigs in August, sells these fat in February or the 1st of March following. Then he has his second lot of suckers come in January. These he feeds cheaply on skim milk and mangels with some middlings, and aims to have them average 100 lbs. each the first of May, when they are sold as store pigs to the cheese factory. He also purchases in the fall and feeds till May for the old country market, eight fine steers. He aims to clear $100 on these, for his cows cannot consume all the rough feed he grows on his farm. He raises half a dozen heifer calves each year to keep up his herd, and has that number of the older ones to dispose of yearly.

If you ask him what any or all of his cows give in milk or money, he can tell you, for he weighs each cow's milk one day in each week and multiplies by 7 days giving him her amount each week, and it comes out so correctly that there is only a difference of about 100 pounds between his and the cheesemaker's weights, which is pretty close work. He keeps 21 cows, which averaged him in seven months at the factory 6,250 pounds of milk or $50 each. The best cow gave 9,460 pounds or $75 68, and the poorest cow gave 3,500 pounds or $28, a difference of $47 to the credit of that excellent cow. If all had given the same as the poor cow, he would have received $600; and if all had given as much as the best one, his check would have amounted to $1,600. His returns are about as follows:—

100 tons of ensilage @ $1.50	$150	21 cows @ $54 each	$1,134
50 " hay @ $8 00	400	8 fat steers, profit	100
30 " straw @ $2 50	75	45 " hogs	360
2,000 bush. turnips @ .05	100	40 spring pigs @ $5.00	200
21 cows to $20 of grain each	420	6 fat cows @ $30	180
		300 bushels of wheat @ .75	225
	$1,145		$2,199
			1,145
		PROFIT	$1,054

He thinks, as near as he can estimate, that his cows consume about $18 or $20 worth of grain each in a year.

THE GENERAL CARE AND FEEDING OF THE DAIRY HERD.

BY W. P. WHEELER, NEW YORK EXPERIMENT STATION, GENEVA, N. Y.

The feeding of dairy cows has received in recent years a very prominent share of the attention of experimenters, public and private. While considerable has been learned

about the economical use of foods, it is found that the cow must still be primarily considered. Aside from the man himself, who must be more competent than his cows,—although, unfortunately, the reverse is possible,—the cow is the prime factor. Important as proper feeding is, labor is wasted unless the stock fed has the inherent capacity for profitable performance. The dairy farmer can himself best decide whether the local conditions make it profitable to consider anything more than the production of milk and butter. In case of doubt, it will not be amiss to follow a rule that serves well in some other occupations: to plan and work for one special product, to take advantage of anything incidental that promises profit, but be sure that everything except the one object is incidental and secondary, and is not allowed to take any but spare labor and attention. Having a purpose for the cow, it remains to get the best obtainable cow for the purpose. There is none too good. The best may often be held at a price beyond the farmer's power to purchase, and he must await his opportunity. He cannot, however, afford to purchase or feed an average cow. Profit is only with those above the average. The farmer seldom has enough capital to buy at once an entire herd of such cows as he needs. He must of necessity breed and rear his animals. He can afford to purchase good blood—not of fancy, but of profitable stock—for breeding, and he cannot afford to neglect for long to do so. He cannot afford to feed forty dollars worth of fodder a year for thirty-nine dollars worth of dairy products, although many farmers have done much more unprofitable feeding. Animals have generally a capacity for using more food than is necessary to simply sustain life. When the food is palatable, much more will be consumed than the needed amount. The excess can be used in work, or the animal becomes fat or produces milk. Under like conditions, there are great differences in the capabilities of individual animals. It is important to select with great care the cow that will transform the most food into the best milk. Experienced judges can select cows which through conformity to certain types are very likely to prove good producers. It will pay well to learn all these judges tell, and to make use of the information, but it will not pay to let the outward appearance of the animal alone determine the value. The record of performance should give final judgment. The most typical cow may sometimes fail to make good her promise, and one of questionable type sometimes excel.

Dairy cows cannot be most successfully handled in wholesale lots on the principle of average. The animals need individual consideration and attention.

Some kind of farm record should be kept, if only of two pages, one of expense in general and the other of receipts. A record can be kept with much less trouble than is supposed by some farmers who have totally neglected this important matter. More time will be saved than is spent at the book. In other lines of business, where there is any competition, systematic bookkeeping is an absolute essential. It is important in the proper management of a dairy herd. Of course, no elaborate system is necessary or practicable, but a simple system of some sort is needed. Guesswork is disastrous.

Aside from the wholesale record of the farm in general, some kind of an account should be booked for each cow. At three or more times during the cow's milking period, her food should be weighed for several days and also her milk. Mixed samples of her milk for the few days should be tested for fat. Then there will be a few facts established. From these can be estimated the profit or loss in feeding. If the margin is large enough to warrant any further expenditure of labor, the cow can be kept until a better one is reared or purchased. If the margin is too small, she should disappear from the herd. It is well to reserve final judgment as to the value of a new cow until she has had time to become used to any changed conditions. It is necessary to keep a record of every date of service for each cow. This can be kept on the sheet given to each cow's general record, or in a little note book used only for records of breeding. After some system is in operation by which the farmer can tell what he is doing, the work of improvement can begin. Improvement there must be or else the herd will deteriorate, actually or by comparison with others,—in either case becoming a source of loss. When purchasing an animal, let health and vigor be the first matters considered. Parentage of health is as important as ancestry of superior performance. A cow whose dam and grand dam can

still be found in perfect health and regular profitable production, is a much better investment at a higher price than an equally promising animal whose parents have disappeared. There is less excuse for ever using an inferior bull than a poor cow, and the bad results of any such breeding are more widespread. For a small herd, it would be better to send cows some distance for service rather than keep an unsatisfactory bull. The bull should have exercise, but in order to be kept in subjection during his best years for breeding, should not be allowed to run at will in pasture. The bull can be worked in the tread power with perhaps as much advantage as in any way. At the Geneva, N. Y. Experiment Station, it has been customary to cut all dry fodder with a team of bulls on the tread. The fastenings of the bull should be of the strongest kind, but he should not be spoiled by solitary confinement. The stable for the cows should not be too small. It should be freely lighted, but so built and sheltered that it can be kept fairly warm in winter. The cows will keep up the temperature of a protected stable in winter, and the heat should not be conducted away from them faster than necessary, for over half the heat produced from the food is required to supply the loss by radiation. The room, however, should be well ventilated, but without draughts of cold air across the cows. The stable at the N. Y. Agricultural Experiment Station gives about 1,500 cubic feet to each cow and the room is comfortably warm in winter, although there are besides the eleven windows and the two double and two single doors, four ventilating shafts running from the ceiling into the loft twenty feet above.

The cows should have some exercise daily in the open air, but should not be obliged to stay out until chilled. They should have free access to an abundance of pure water at least twice a day. The temperature of the water should be in winter if possible 50° F. or higher. It is not generally profitable to warm the water artificially, but cattle should not have to eat snow and ice to satisfy thirst. The changing of ice into water requires much more heat than that necessary to warm ice cold water up to the temperature of the body. Unnatural thirst should not be created by too high temperature of the stable or the use of too much salt. It is generally found expedient and profitable to keep the cows in the stable much of the time and they should be, therefore, fastened in a comfortable manner; either attached at the neck by chains which slide by rings on vertical bars, one on each side, or having the collar fastened to the middle of a bow, which is attached, on pivots at the ends, to the sides of the manger in front; or one of the swinging stanchions could be used. The old style rigid plank stanchions should be discarded. There should be low partitions between the cows, and each stall should be three and one-half or four feet wide. If the mangers and partitions are constructed on a frame or cradle fastened to the floor only by a few large wood screws, the distance from manger to gutter can be easily changed to suit the size of the cows. The tight gutter behind the cows, shallow but of good width, seems to be as satisfactory as any substitute to help keep the stable and cows clean.

The cows should be kept clean by currying and brushing, and the stable clean and free from bad odors. Straw or shavings or sawdust can be used for bedding, and land plaster can with advantage be lightly sprinkled in the gutters. The sooner the manure is put on the land the better. The less manure of any kind about the stable in summer the fewer the flies.

No boisterous and rough herdsman should be employed. The cows should be handled with kindness always, and quietly, without excitement. There should be a few box stalls for the cows at calving time. These should preferably be in a large room with the rest of the herd, or in a room where several of the cows are. The cow should be put in the box stall a week or more before the calf is expected, and taken out daily for exercise. It will be found a good rule to have the cows dry for a month or more before calving, with few exceptions. It is best not to force a dry condition in very persistent milkers. The grain should be gradually taken from most rations for some weeks before milking is stopped. As a precaution against the appearance of milk fever it is well to feed very moderately for some weeks before calving, only beginning to increase the ration a little, with perhaps wheat bran, a few days before the calf is dropped. The cow should not be fat. Roots or similar food of a laxative nature and not too

stimulating should be fed at this time. The old method of depending almost entirely upon pasturage, and feeding nothing additional while the pasture would support life has been gradually changed. Many cows now have no pasturage, and in some herds the cows scarcely see the sun while their servitude lasts. The extreme system can hardly be now considered by the dairy farmer who wishes to breed from the cows he most profitably milks. The cows could have exercise in the open air, and if this can conveniently be for most of the year on good pasturage so much the better. But so far as the producing power of good land is concerned, much more can be obtained by mowing the field and keeping the cattle off than by pasturing In fact four times as great a yield for the season has been obtained by cutting fully grown crops of grass as from frequent cutting of immature growth. The young pasture grass, however, is more palatable and from its being more succulent and containing a larger proportion of nitrogenous matter, is better suited than is the mature grass without grain to encourage the flow of milk. In the system of soiling where the fields are mowed and the cattle fed in the stable or in small paddocks, advantage is taken of the greater food producing power of the land. A system that allows some pasturage and permits much additional feeding is for some reasons the most desirable. The cows have the benefit of fresh air and sunlight, but are not obliged to travel constantly to find sufficient food. Land can be pastured that cannot be cultivated to advantage, and on some of the best land can be grown fodder crops in a way to secure the greatest product. The fodder can be regularly supplied to the cows so that dry pastures will not interfere with the steady flow of milk. Of all fodder crops suitable to most of the dairy regions of America, Indian corn is probably the best. The crop is easily grown and the yield is heavy. The fodder is very palatable and at the time of its highest nutritive value, is especially adapted for preservation in the silo. Red clover supplies food of superior value for milch cows whether in the form of grass foder, silage or hay. Alfalfa, although probably not hardy north of the southern portion of Ontario, is a plant of decided value for soiling In palatability it ranks high and the fodder is rich in nitrogenous matter. Three or more cuttings can be had in a season, giving a total product of digestible food constituents greater than that of most crops. Roots are of somewhat less nutritive value than some other fodder crops, although the often great yield compensates for this. The larger producing varieties of mangels and rutabagas are most profitable. They are very serviceable in making rations which contain much dry fodder more palatable and in avoiding some disturbances of the general health. Oats and peas sown together make superior green fodder and good hay. For late sowing barley can be used in place of oats. The corn should be cut when the kernels begin to glaze, the clover when in bloom, the alfalfa when blossoming just begins, and the oat-and-pea fodder before the peas begin to ripen but after the pods are well formed. To have an uninterrupted succession of sufficiently matured fodder through the summer is often difficult, because of uncertain weather conditions. Grain is of service, but dry hay will not be eaten in sufficient quantity, when pastures have dried in hot weather to prevent a too rapid falling off in milk. Silage, however, is freely eaten during summer and it is good economy to have silo capacity enough to supply the herd not only in winter but whenever in summer food is needed. The increase in the number of silos, to the extent of thousands, in dairy regions where there were formerly few, shows the growing appreciation of their value. Many efforts have been made in recent years by those who have studied the subject of feeding to induce the farmer to give more attention to the chemical composition of foods in arranging his rations, and these efforts have often led to much improvement. The dairy farmer should be willing to give some study to this matter for there are many publications obtainable which relate to the subject. A ration for milch cows that is considered by many to be well "balanced" allows, to each cow of about one thousand pound weight, about twenty-five pounds of total food per day, aside from the moisture and mineral matter. This should contain of digestible constituents about 2½ pounds of protein, 13 pounds of carbohydrates, and a little over half a pound of fat. For work and fattening the carbohydrates (starches, sugars, etc) and the fats serve an important purpose. While the protein constituents do this also to some extent, they serve a purpose the others cannot, for they alone contain nitrogen. So, for growing animals and milch cows which require much nitrogenous matter it is

very important to consider the amount of protein in the ration. More especially is this necessary because some of our best foods such as corn, roots, etc., contain a low percentage of these constituents. The relative proportion of the carbohydrates and fats it is not, in general, of so much importance to consider, for although the fat has over twice the fuel value, and may therefore be considered more concentrated, it is not found in large amounts except in some by-products. The most profitable results can be obtained at times by feeding rations differing considerably in composition, but it is well to follow in a general way the ration cited, for this is an average of many that have given the best results. The amount fed should of course vary according to the capacity, age and condition of the animal. For feeding with corn silage or roots in winter oat-and-pea hay can be used, but clover or alfalfa hay is much better. The grain for a ration largely corn or roots should consist mostly of some of the more nitrogenous products such as pea meal, wheat bran, linseed meal, and some of the gluten meals or cottonseed meal. Corn meal can be fed to advantage when clover silage is used or green fodder of clover, or alfalfa, or oats-and-peas. Ground oats, when this grain is low in price, can be added with advantage to most all rations. In hot weather the pastures should have shade or be used at night, and the cows fed on green fodder in an airy stable away from the heat and flies. Small areas should be pastured in succession if possible. Four pastures are better than one of their aggregate area. The grass is eaten more evenly, and the animals have a change while the pastures get also intervals of rest. The importance of looking after the cows individually is nowhere more noticeable than in the matter of feeding. It is profitable to give each cow all the food she can use to advantage but to also avoid overfeeding in any way for individual animals differ much in capacity. Sometimes a fodder that is entirely satisfactory to most of the herd will not suit one or two animals which can never be induced to do well with more than a small amount in their ration. Generally aversion to some new food that is nutritious and healthful can be overcome by gradually increasing the amount fed. It is not advisable to make a very radical change to some uncertain ration, for it is easier to sustain a good flow of milk than to recover it after it is seriously interrupted. Cooking or steaming foods for cattle is not profitable except in occasional instances such as making gruel for calves, or in an enforced use of of some food not otherwise palatable. While the cow must be a capable one, the amount of milk is influenced largely by the abundance and quality of the food. The composition of the milk, however, is characteristic of the animal. The flavor of the milk is affected but very little by ordinary fodders, especially if any uncertain one is fed to the cows after, instead of before milking.

Calves intended for the dairy should be as carefully fed while growing, as when, after reaching maturity, they are giving milk. For the first few weeks they should have warm sweet milk. Skim milk can be gradually substituted. After a few weeks, ground flax seed or linseed meal can be added. Ground oats can be fed later, and when old enough, some grain should be regularly fed with the coarse fodder. Calves dropped in the early fall can be pastured to advantage the next summer. Except where, for local reasons, it is desirable to have part of the herd fresh in milk in the summer, it is a good plan to have most of the cows calve in the early fall. Under well arranged methods of soiling the best results in milk by the year can generally be obtained this way. When any dairy farm in the neighborhood is known to be a particularly successful one, it will pay to become acquainted with the system of management. It is of as great importance however, to learn all possible facts concerning the management of any farm that is known to be decidedly unprofitable. Information thus obtained will sometimes prevent costly mistakes. It will certainly pay to read at least one periodical in which dairy matters are fully considered. Unless the dairy farmer has some special interest in his business besides the primary one of earning a living, he is likely to meet with indifferent success whatever his capabilities. His less capable neighbor, following the business in preference to any others, will take the lead. The dairy farmer like any other successful man must be willing to very often trouble himself with extra details not booked or anticipated.

FEEDING DAIRY CATTLE.

By A. K. Yuill, Carleton Place.

Commencing with the cow the day before she calves, we place her in a comfortable, well bedded box stall, and as soon as the calf is dropped lift it into the manger where the cow can lick it and the calf cannot suck. Milk the cow and feed the calf, and give the cow the milk the calf leaves. Leave the cow and calf together for a few hours, but do not let the calf suck. Then tie the cow in her own stall and put the calf in another stall. I will tell how we make a dairy cow out of the calf. We feed the calf all it will take of its mother's milk for the first four days, after which time the cow's milk is fit for family use. Keep a little less of the whole milk and add a little skimmed milk. Keep on decreasing the quantity of whole milk and increasing the quantity of skimmed milk until at the end of two weeks the calf will be getting all skimmed milk. As soon as the calf is on all skimmed milk we add a little linseed tea. We start with a teaspoonful and gradually increase until we give each calf about two tablespoonfuls at each feed. We put the flax seed into a three quart can and pour boiling water on it and let it stand for twelve hours. We just feed the liquid and put the solid seed into the pigs' barrel. When the calf is three weeks old she will eat fresh well cured clover hay, a little pulped turnips, and a very little chopped or whole oats. As soon as she will eat the oats up clean we feed the flax seed meal with the chop until she is one year old. We stop putting the flax seed in the milk when we put it in the chop; feed it dry with chop. Keep on increasing the quantity of feed as the calf grows; keep her growing but do not let her get fat. Our bull calves are fed in the same way, only we feed them a little more than the heifers. Our calves are dropped in the fall and we put them out on grass in the spring. If the flies are bad we keep them in during the day and let them out at night. We let the calves run loose in a box stall when not feeding, but tie them to feed.

Our yearlings are wintered on wild hay, turnips and ensilage, fed just enough to keep them in a good healthy condition, but not to fatten them. We breed our heifers when about eighteen months old, but if they are small we let them run a little longer, say twenty months. If they are big or inclined to fatten, breed at sixteen months; the calf will be dropped at about twenty-six months old. Then milk the heifer at least twelve months, and let her run dry two months before having the second calf. When the heifer calves we are very careful and treat her gently, thus we do not teach her bad habits.

A day with the milch cows. We get up at five o'clock every day in the year, go out and milk before breakfast, and the butter-maker separates the milk. After breakfast we take the skimmed milk to the calves. One man feeds the calves and cleans and beds the stables; the other man waters the cows and feeds them. We feed wild hay and unthreshed oats, (three to one) a little turnips and ensilage. The hay and oats are run through the cutting box. After we feed in the morning we mix the hay, oats, pulped turnips and ensilage for the next two feeds. After the feed is put into the cow's manger we add half a gallon bran and half a gallon chop for each cow, and mix in the manger. The chop is oats, barley and peas, two, one and one, ground together. Put two ounces of coarse salt on the feed in the manger every morning. When the feeding and cleaning out are done, the men curry the cows till they are done eating and then leave the stables. Our morning work is done at half past nine. We then leave the stables and do not return until half past three, when we water, feed and clean the stables the same as in the morning. The work is done at five o'clock when we start to milk. We get through about six o'clock, and after supper feed the calves and end our day's work. We let our cows out for about ten minutes on fine days, but if the weather is cold or stormy we never put them out. Cleanliness and punctuality are two things that must be looked after carefully. If our cows are milked an hour late on Sunday morning, it takes until the next Wednesday morning to get them back to the same amount of milk as they gave on Saturday. Cows should always get good spring water. We pump and chop with wind power. We cut all our feed and bedding. We are very careful when making any change in the feed; all changes are made gradually. The same men should milk the same cows and in the same order. Our stock bull is fed the same as the milch cows.

HOW TO IMPROVE OUR DAIRY HERDS IN THIS DISTRICT.

By J. S. Miller, Parry Harbor.

This is a subject of great importance to every farmer in the district, and in co sidering the subject we must take into consideration the nature of our lands and al other circumstances peculiar to this district.

In the first place nearly every farmer keeps cows for milking purposes, the greate part for making butter at home, some sending the milk to cheese factories. In ever herd there are one or more good cows, some middling, some inferior. The first thing t do is to find out the value of each cow's milk. This can be done by keeping a record the weight of the milk given by each cow and testing how much butter fat there is in i and every cow that does not give over 4,000 pounds in the season, testing on an averag three and an half per cent. butter fat, should not be kept as a dairy cow at all, simpl because the value of her milk would not keep her for the year—4,000 pounds at sevent cents is $28.

In the second place we should use a pure bred sire of one of the dairy breeds. No this is where so many make the grand mistake, by just using whatever sire is in th neighborhood without ever considering whether they are going to improve their stock o not. There is a great difference of opinion as to which breed is the best. Some prefe the Jersey, some the Holstein, some Ayrshire, and some the Durhams. Think this ove for yourself, and whatever breed you consider best start with it and keep on with it. N man will ever build up his herd by using first a Durham, then a Jersey, and then Holstein. This is what many have done in this part. When we have obtained a goo herd we must take the best care of the calves from their birth, but especially during th first year, for if allowed to get poor at that time it is very hard to regain what was lost in fact, almost impossible.

BREEDING, FEEDING AND REARING OF DAIRY CALVES.

By S. Shaver.

The subject which has been allotted me is of great importance when we consider th revenue which comes to our country through our dairy products. My subject should b studied with care. A great quantity of our dairy products must be sold in the market of the world, therefore we must study not only to produce the best, but must study t produce it as cheaply as possible, so as to obtain a profit. If there is anything in breed ing or feeding or both, that causes cows to differ one from another in economical pro ductive capacity, its importance must be conceded. That they do differ in some degree i universally observed, and that this difference assumes wider proportions than is comonl supposed, has been proven by as carefully conducted experiments as the wisdom of ma can devise. What is it that causes this difference? It cannot be feeding alone, o environment, or care, or anything else subsequent to birth, for we can observe those differ ences when there is uniformity in all these particulars. It must be, therefore, tha animals are born with different capacities for production. And hence improved dair cows can be bred with just as much certainty as improved beef cattle, improved draf horses or roadsters, or any other kind of domestic animals. What is intelligent improve breeding? It involves something more and beyond the mere perpetuation of the spec es It implies selection, care and judgment; also, more than the mating of two animals. Fo each of these trace back to scores of ancestors each more or less different from the othe in function, form or temperament, as well as color and potency. Wild animals breed tru to type without an exception, and in like manner every calf has in itself the germ o every possibility that is inherited in either its sire or dam and none other. If the parent are of mixed blood and mixed characteristics, so will be the progeny, and in greate degree, but always subject to the law that the stronger or more potent will predominate If it was not for our lack of knowledge of the characteristics, and possibilities of our breed

g stock we could know just what we are going to breed if this be true. If we are going have better cows, they must be better bred and to this end we must select better cows · dams, cows that have the characteristics that we wish to reproduce and perpetuate d what is still more important, we must have better dairy bulls. Something has caused to give little heed to the truth that the "bull is half the herd,' and in consequence ough we may have ten or twenty cows, we hesitate over the price of a good bull to put th them, as much as we would over a heifer, and sometimes let $10 or $20 hinder us om getting a good bull. The loss of keeping one or two poor cows is nothing to be mpared with a bull that is an inferior sire. He leaves his impress on your ten or twenty lves, either for better or for worse and it is three years before you find out the character that impress. It is apparent therefore that his selection should receive the most telligent consideration But "breeding," important as it is and as I have tried to make appear, is only half the story. When we get a calf from an ideal cow bred to a dairy ull that has been bred specially for the dairy, we must feed that calf intelligently. For stance I would feed it whole milk from two to three weeks. Then I would gradually ix in skimmed milk invariably warm as cow's milk. In a short time the calf will eat hole oats, fine hay, oats in straw, and corn fodder; this will develop its digestive gans so as to be able to consume later on and assimilate as large an amount of coarse dder as possible. Her future usefulness as a dairy cow depends on the amount of od she is able to manufacture into butter fat. The calf must be kept thrifty, but not t. We want to teach our heifers to produce butter fat, not tallow. I believe we can estroy our calves and heifers by teaching them to lay on fat. I would feed to keep ifers thrifty, and would breed them when about fifteen months old to the best bred iry sire I could get.

HOW TO MAKE DAIRYING MORE PROFITABLE.

By John Robertson, Ingersoll.

During the past ten years a great amount of information has been given to the griculturists and Dairymen of the Dominion. The Dominion Government, through its xperimental Farms, and the Provincial Government through the Ontario Agricultural ollege and Dairy Schools, have each done a grand work for our farmers and dairymen. he Dairy Associations and Farmers' Institutes have been channels through which valuble instruction and information have been given. Through these institutions, opportunies have been given to the farmers not only to listen to the lectures and addresses which ere given, but to discuss, and exchange ideas and experience with one another for their utual benefit. There is no doubt whatever but the progress which has been made in ur Dairy industry, is largely due to the assistance which has been given through these arious institutions and it is fondly hoped that the usefulness of these institutions will be ore and more appreciated by the farming community, and that their usefulness and ffectivness may be largely increased in the future.

Notwithstanding all that has been said and done, the sad fact still remains true, at many poor cows are kept for dairying which hardly keep themselves, and give little no profit to their owners. And there are also a good many cheese factories in the rovince that are still a long way below finest in the quality of the cheese manufactured. s for dairy butter, at some seasons of the year it is almost unsaleable at any price, though in some instances a decided improvement has been made; but where it is ractical, creameries are by far the most profitable way of making butter.

I am certain that farmers and dairymen have not yet realized to its fullest extent ie importance of the one point, "quality" in their dairy produce. I believe this is the ost important question of the day in our dairy industry. Dairymen in other countries re devoting both time and money to the study of this question of quality, and these are ie very people our dairymen will have to compete with in the disposal of their dairy roduce in the markets of Great Britain. Unless our dairymen study this question of

quality carefully and make the most of it they possibly can, they will lose ground inste of making the business a success. Our dairymen must not forget that present attai ments are not to be too much relied upon. Others are studying this question and a making progress in their dairy work, and unless our dairymen keep progressing in the business they will not only lose their present position but will be defeated in the strugg for the top of the market. How then can the quality of our dairy produce be improve I would say, by a more perfect knowledge of the conditions required. And what a these conditions?

First, I would say, every manufacturer should be a good judge of the raw materi he is to manufacture.

Second, he must also know how to handle it and how to finish it in the best possib manner for the market he intends to supply.

Third, he must have proper appliances and conveniences with which to do his wor economically. Apply these conditions to dairying and there is every ground for goo success.

The composition of average normal milk is about as follows:

Casein, or curd,	4.05 %
Butter fat	3 80 %
Milk sugar	4 55 %
Salts or mineral	.60 %
Total solids	13 00 %
Water	87.00 %
	100.00 %

So far as quality is concerned, with good food and pure water and similar condition one herd of cows will make about as fine quality of dairy produce as another. It i amazing to think that from the same quality of raw material, one person will make butte worth twenty cents per pound, another person will make butter worth from ten to twelv cents per pound and difficult to dispose of at that There can be no other reason for thi than that the one person has more knowledge and skill than the other in the art o butter making, and works his or her skill into the article they produce. It has receive the finishing touches, which only a skillful maker can give, wrought into it at every stag of the process. It is the fine finishing touches that makes any piece of workmanshi excel others in merit, and so it is with dairy produce. To give anything like a complet detail of the process of butter making would be out of place here, but the principle is ver simple. The science of butter making is very simple First, the separating of th butter fat from the other constituents of the milk as perfectly as possible. Second, ripe the cream properly to the right condition for churning. Third, churn at the prope temperature, so that it will take from forty to fifty minutes to finish the butter makin in the churn. To give the butter a good grain and a good solid body and texture, an be perfectly separated from the butter milk, so that no butter will be left in the butte milk, wash it with pure cold water and salt it, and put it up neatly for the market yo intend to supply. These same principles apply to the creameries as well as to privat dairies. Creameries need to be watchful to make the finest quality as well as privat dairies. The science and art of cheese making is more complicated than butter making and requires more skill and experience to be successful. Cheese making consists i combining the butter fat and the casein together with the proper amount of water, o moisture. This has to be done slowly and with considerable care, and at the same time there are chemical changes taking place during the process which require close watching The particular points in cheese making that need good judgment and careful observatio are as follows:

First, the condition of the milk when ready to set.

Second, the condition of the curd when ready to dip.

Third, the conditon of the curd when ready to mill, and

Fourth, the condition of the curd when ready to salt.

If these points are properly attended to, and the curd in the right condition as the process advances past these points, the result will be good if the milk has been good. Every cheese factory and creamery should be a dairy school for the district which supplies the milk. The manager of the institution should be capable of giving his patrons all the information they need; how to handle and care for their milk, so that he may have the best material to work with and produce the very finest quality of cheese which will always be in demand at the very top price on the market. In this way every patron would receive more money for his milk; and it is to their own interest to supply the factory or creamery with the very best quality of milk, in the very best condition, to obtain the best results. Quality means money in dairy produce at all times, and quality if judiciously produced means profit and success.

The second part of this question belongs to the production of the milk for increase of profits. There is no dairyman who keeps eight or ten cows, but has one or two cows that give him more profit than the others; and also he has one, or perhaps more, that gives him little or no profit. Every dairymen knows that some cows make more and better milk than others out of the same feed and under the same conditions. Why is this? We cannot tell why, only one is a better constructed cow to make milk than the other. This is where a great many men fail in not making dairying pay. They have not got the best kind of cows for making milk. This is where there is great room for improvement; and it may be said that the right kind of cows is the very foundation of profitable dairying everywhere.

The next important consideration is the feed of the cows. Some kinds of food can be produced more cheaply than others. We do not mean by cheapness that a bushel of oats is cheaper than a bushel of wheat or peas, but we mean that an acre of land will produce more food for cows from some crops than from others. This is a subject that should receive more consideration.

Another point of consideration for profit in dairying is good comfortable stables in cold weather The natural temperature of the cow's body is about 98°. If she is in a stable where the temperature runs away down below freezing, to near zero, she will consume nearly all the food she can eat to keep herself warm, and she is not to be blamed for so doing; but if kept comfortable, what food she can spare after her own wants have been supplied, she will make into milk or flesh as the circumstances may be. It will be easily seen from this that there is much loss occasioned by the want of comfortable stables.

Arrangements have been made for the transportation of our dairy goods from the place of manufacture to the principal markets of Great Britain, and it now remains with our dairymen to produce the right quality of goods to suit the market and please their customers better than any one else. Then they will have succeeded in making a success of dairying and will have both pleasure and profit therefrom.

THE REQUIREMENTS OF THE BRITISH CHEESE AND BUTTER TRADE.

By H. A. Hodgson, of Hodgson Bros., Montreal, Que.

Cheese. It is most desirable that this article should be sold in quantities when the youngest cheese are about 15 days old, with the exception of the first half of May make, which should be made to cure early, so as to be ready to be shipped out at 10 days old. This can be done by light salting, say at least 2 lbs. per 1,000 lbs milk, and adding sufficient rennet to cut the curd in 15 minutes, using the usual amount of cooking and drying so as to give it body, but the last half of May should be salted at the rate of 2½ lbs. per 1,000 lbs. milk, and June cheese should be salted at least 3 lbs., and makers should use less rennet and bring the cheese down firm bodied. Cheese made during the months of June, July, and the balance of the season, should not be shipped from the factory younger than 15 days old, and it is important that the factoryman should have a good curing

room, so as to give the cheese a good even curing temperature. The curing rooms should be lined with good matched lumber, having a space of at least one foot between the inside and outside walls, which should be lined with tar or felt paper in such a way that the rooms could be turned into cold storage rooms if desirable without much extra expense. Cheese should be kept as clean as possible while at the factory, and when shipping should be well boxed, double scale boarded top and bottom, and nailed down tightly so as to have the top of the cheese close against the lids. Cheese carry much better across the ocean in this way than if loosely packed. Canadian cheese has attained a very high standard on the English market, but we think there is room for improvement, especially in flavors, and this could be improved upon if more attention were given at milking time. We have travelled nearly through the whole length of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island, and we have seen some very carless milking. Cows should be milked on the highest level of the farm, where free ventilation of air can be had, and away from the barnyard. When in England I visited a model Dairy Farm, and found the cows were driven into a cobble stone yard with a drain running in the middle. The milk maids had to show their hands, and if they were not clean they were sent back to the kitchen to wash them; the same also with their pails and stools. After each maid had finished her cow, the cheesemaker tried to milk the cow to see if it had been thoroughly milked. Now, if all our farmers would take these pains, see that their hands were clean, and the cow's udder and teats well cleaned before milking, better flavors would result therefrom.

Butter. Our shipments last year placed our butter in a higher position than we have reached in former years, and it is regrettable that a large number of our creameries have stopped making butter this season and have turned their attention to cheese, mainly on account of cheese selling relatively higher than butter. The increased quantity of butter being made in the States at the present moment is supplying the English wants, and their prices are fully one per cent. per pound under ours. The make this season promises to be fully 30 per cent. to 40 per cent. less than last season, and although is true that the present receipts are being largely absorbed by our local trade, yet it will not be long before this source is satisfied, and we shall have a surplus for export. Boxes are largely coming into favor on our local market, and are preferred largely in England. Only wire nails should be used, even in the cover, and then only a few should be used, or screws or other devices employed, so that the cover may be removed without disfiguring the package. It is very important that the boxes, and even tubs, should be paraffine wax lined, as it prevents all possibility of a woody flavor being imparted to the butter. It is also important that the boxes should be kept perfectly clean. For this purpose the creameries should either ship their butter encased in bags, or else straw should be used on the bottoms of the farmers' wagons and railway freight cars as well as between the packages. Style and appearance as well as convenience in opening, help the sale, while dirty or ordinary sawn or nailed boxes hurt the sale of the butter to a considerable extent. Three per cent or half an ounce of salt to a pound of butter is the standard requirement for export and our local market. Never more than this should be used, but London market can take even a little lighter salting. The demand is for a nice pale straw color, and even in the month of June the creameries should avoid high colored butter, which can easily be done by proper manipulation of the cream. It is important to pack the boxes full, and to contain as uniform a weight as possible, so that the butter will turn out 56 lbs when it arrives in Great Britain. No salt should be used as a paste on the face of butter packed in boxes. (This does not apply to tubs).

Parchment Paper. Use only the very best quality; never less than 35 lbs to the ream, and preferably from 40 to 50 lbs. should be used. This paper should be used in two pieces, and not in three or four as is sometimes the case. It should be of sufficient width to lap well over the butter on all sides. The same kind of parchment paper should be used for boxes and all kinds and sizes of tubs. Most of the parchment paper used by the creameries last year was too thin and light. It is to be hoped that our factorymen will not use this light thin parchment this year. Mould in butter is generally caused by green wood and poor parchment paper, or by the butter being kept too long in a damp, poor ice house.

DAIRYING.

By Harold Eagle, Attercliffe.

Dairying, I have been told repeatedly this last two seasons, "is getting played out." But since the price of cheese went higher the latter part of last season, it rather looks now as though dairying was not played out entirely. Dairying, like anything else, has times of depression, and when all other farm products had fallen in value, it was hardly to be expected that dairy products alone would keep up in price. And it would be impossible for them to do so for various reasons. In the first place, when beef and pork are cheap in England, cheese and butter cannot go very high in price unless the supply falls short of the demand. And the very fact of meat and meat products being cheap tends to lessen the demand for cheese and butter, because when meat is cheap, people can eat more of it in preference to paying good prices for cheese and butter, thus lessening the demand for cheese and consequently lowering the price.

Doubtless, this was one cause for the low price of dairy produce in 1895 and the first half of last season. But this alone did not cause the low price of cheese in 1895 and '96. It is a fact that Canada now produces and exports about sixty per cent. of the cheese consumed in England, and though the season for making cheese in Canada is only about six months, the consumer in England is eating cheese every month in the year. The patrons of the factory in Canada, the producers, want the cheese sold right along in the cheese making season, because they want to use the money it brings, and I know perfectly well that when cheese is a fair or a good price, the salesman cannot sell too often. If cheese in Canada is sold right along when it is ready to ship, some one must buy it then. The English consumer buys cheese as he wants to eat it, week in and week out the year round. These two facts, the one that the cheese making season in Canada is about six months, and the other that this six month's make of cheese is consumed not in the six months but in twelve, brings in another element in the fluctuation of prices. As the Canadian producer sells his cheese in the summer months and fall, some one has to buy it and carry it along for the consumer, or until the consumer is ready to use it. This, as I said before, is one of the chief causes of varying prices—markets going up and down. You all remember three years ago, in the season of 1894, cheese was comparatively higher in price than any other farm product, because the make of the previous season, 1893, was all cleared up before the make of 1894 began to go on the market. Cheese started at ten cents per lb., or better, for May cheese, and the price kept up well all the season. The English importers got an idea that the make of 1894 was going to be short on account of the dry weather early in the season, and because the make of 1893 had been short. But the rains later on increased the pastures, and the balance of the season's make was larger than expected. However, the English importers paid good prices for summer and fall goods, and as the winter passed they found, owing to a further drop in prices of meat and meat products, which lessened the consumption of cheese, that they had considerable stock left over when the cheese of 1895 began to appear on the market. Instead of selling the old cheese, (the 1894 make), for what they could get, they held on well into the summer of 1895 and lost heavily. Consequently, they paid considerably less in Canada for cheese in 1895 than in 1894. And not only had the price of cheese fallen in Canada, but it had gone down in England for English cheese, in fact, when June cheese in Canada in 1895 was selling here for eight and a half cents, English cheese was bought in England for seven and a half cents per lb. The reason for that, was that in Canada the English importers could put cheese in cold storage and hold for better prices. In England they did not have the cold storage facilities, and the cheese had to go into consumption for what they would bring. The season of 1894 was the best in Canada for years. The season of 1895 was the worst, and the season of 1895 was not bad for Canada alone, but all the other dairy countries suffered. In England, the farmers who had begun to turn their attention to dairying, because other lines of farming were not paying as they used to, became discouraged, and a good many dropped dairying or rather cheese making, and sold milk in the cities and towns. New Zealand was looming

up as a competitor with Canada for the English trade, but the low prices discouraged them. And here in Canada, numbers of farmers were getting the idea that dairying was playing out, and were dropping out of the cheese factories or only continuing in a half-hearted way. Thus the production being curtailed all round, the demand got better and the price naturally increased, and we had fair prices for the later part of last season, and the prospects are good for the coming season. I have always held, and am firm in my belief, that it takes too much hard work to really overdo the dairying business.

I have treated so far solely of the cause of the fluctuation in the price of cheese, because I have been told so often in the last two years, as I stated in the commencement of this paper, that the dairying business was playing out or getting overdone. I have often heard the Hon. Thos. Ballantyne say that cheese was the easiest disposed of of all farm products, for as soon as cheese goes down in price the consumption increases and when it is cheaper there is less made. Therefore, the make being less and the consumption greater, the demand is increased and prices go up. I believe the dairymen will agree with me that cheese is about the last thing in farm products to go down in price and the first thing to go up. It matters not whether cheese is comparatively high or low in price, if the quality is not up to the standard, the price will necessarily be lower in proportion to the lack of quality. To make either good cheese or butter the maker must have good raw material, that is, good milk. And to have good milk it is necessary that the milking should be done in as clean a manner as possible, and that the milk should be strained and aerated right away after milking. Dairying is the best paying branch of farming at the present time. The total amount of money received in Canada for cheese exported is about $15,000,000 per annum. That is a larger return than from any other farm product. But while dairying in the aggregate has so good a showing, there are individual farmers, patrons of factories, who do not make any more money per cow now than they did ten years ago. And one reason is that the cows are left out doors too long in the cold and stormy fall weather. This fault is not as general as it used to be, but there are a number of people yet who hold to the idea that a cow needs lots of exercise at all times of the year. Some men say, leaving cows outdoors in winter makes them hardy. Ex-Governor Hoard, of Wisconsin, says that the hardiest cow he ever saw was leaning against a rail fence, frozen solid. To be successful in dairying, care must be taken of the cows all the year round, and they must be well stabled and not left out doors in stormy or extremely cold weather. Another thing that the dairyman who wishes to succeed has to consider is the cost of production—the best and most economical way to feed. The last few years the dairymen of this district have gone into raising corn for dairying purposes. The next thing is to build silos. There are about 3,000 silos in the state of Wisconsin, and the most progressive dairymen in the older dairy districts of Canada are all using silos. I have not the number of silos in Ontario now, but the number is increasing every year. I have met a good many people who are using silos, but I have not met one person yet or heard of any one who is not satisfied with his silo. If you have a silo large enough, you can have ensilage enough in the spring to carry your cows along until the grass gets a good start. In fact, some dairymen feed ensilage right along until corn is ready to cut for feed. A good plan for summer feed where there is no ensilage is to sow peas and oats in the spring, mixed for feeding green. If this is done by putting in a piece every week for five or six weeks, commencing as soon as you can work the land, you have feed for your cows when the pasture gets scarce, thus keeping up the flow of milk until the corn is ready to cut. If corn alone is depended on for summer feeding the cows fall off in the quantity of milk given before the corn is ready, but by having peas and oats, which are ready as soon as the pastures begin to fail, the flow of milk is kept up and the profit increased.

HORTICULTURAL DEPARTMENT.

PLANTING AND CARE OF APPLE TREES.

By Ellis F. Augustine, Aughrim.

Notwithstanding the low prices received for shipments of apples to the British markets during the past season, apple growing, when carried on intelligently and systematically will, in my opinion, taking one year with another, always prove a paying industry and profitable adjunct to the general farm management. I certainly believe that the past year's experience has had a good effect in conclusively demonstrating how useless and unprofitable it is to grow anything but fruit of the very first quality, gathered in the best possible condition. It is reported that in some districts orchardists have become so discouraged as to have actually contemplated cutting down their trees; but as a year of low prices is usually followed by more profitable ones, I am satisfied that it will pay every farmer and fruit grower to give his trees the best possible care and attention at his command. As I therefore still have faith in the production of apples for commercial purposes, as well as for home use, I submit the following details which I believe to be necessary in the planting and care of apple trees. For best results the ground should be deeply plowed, and when possible subsoiled, as this encourages deep root penetration thereby rendering available much otherwise inaccessible plant food. Thorough drainage is the primary essential to success, and it is worse than useless to set out trees on a wet cold soil, for although they may manage to sustain life for a few years they cannot thrive under such adverse conditions, as the hearts will soon become decayed and the trees will eventually die. Therefore, if the subsoil is of such formation as to preclude natural drainage, the field should be thoroughly underdrained with tiles. These, if the lay of the land will permit, should be run at equal distances between every two rows of trees, for if placed too closely to them the attendant dampness will cause the rootlets to enter and choke up the drains. The stock should be procured from some reliable home nursery, and if possible a personal selection should be made. A mistake which is common, and one that I, too, have made, is setting the trees too close together. They should be set not less than thirty-five feet apart, and even forty will be found none too far. This may appear quite a distance when the trees are first set out, but it should be taken into consideration what the spread of branches will be when the trees have reached the age of thirty or forty years.

Before the trees arrive the ground should be carefully measured over and a small stake driven where each tree is to stand. Be careful to get them exactly the same distance each way so that the tree will "row" in every direction, as this will give the orchard an attractive appearance, and appearances go a great way towards adding value to everything about the farm. When transferring the trees from the nursery, the roots should be well protected from wind and sunshine. When ready to begin the work of planting, take a piece of inch board, three feet long, bore a two inch hole near one end, and cut a notch in the centre and another near the opposite end. Place this so that the stake where the tree is to set will come in the centre notch. Then drive a small stake in the end hole and notch; swing the board round, pull up the centre stake, and dig the hole exactly where it stood. When ready to set the tree swing the board to its former position and place the tree so that the stem comes in the centre notch, as shown in Fig. 1 in the chart. This will ensure straight rows and save all trouble of sighting. The holes should be made considerably larger than the spread of roots so that none will be crowded, and the rootlets will have a fine though compact soil in which to take hold. A few shovelfulls of fine surface soil should be thrown in the bottom of the hole in a crowning manner so that the roots will spread over it with a downward tendency. All broken and

bruised roots should be cut off smoothly with a sharp knife in such a manner that the cut surface will rest upon the bottom soil. This will cause new rootlets to start out much more readily. The tree should be set about two inches deeper than it stood in the nursery, and leaned slightly in the direction of prevailing winds. The soil should be well worked in among the roots, and when the hole is about half full part of a pail of water may be thrown in to settle the ground among the roots, after which the remainder of the soil should be replaced tramping it firmly about the base of the tree. A mulch of strawy manure is beneficial, but this can be dispensed with if frequent cultivation is given. In forming the head of the tree from three to five branches should be left. These should be cut back to within four buds of the last season's growth. This is important as in removing the tree from the nursery many roots are severed or broken, and if a corresponding pruning is not given to the head of the tree it will be out of all proportion to the roots, which will therefore be unable to supply the demand made upon them. This is one principal reason why newly set trees sometimes start growth and then wither up without any apparent cause. In cutting back leave the last bud on the outer side of the limb for upright growing varieties such as the Northern Spy, and on the inner side for spreading ones such as the Greening. The last bud on the limb is the one that will usually force, and in this way the form of the head can be considerably controlled. If the limbs are in such a shape as to be undesirable forming a head, or if there is simply a crotch, cut away all but the straightest one leaving simply one straight stem. Cut this back at the desired height and from it a number of shoots will start from which a satisfactory head can be formed. In the chart Fig. 1 shows a perfectly formed head, cut back correctly at the time of planting. Fig. 2 shows a imperfectly formed head. Fig. 3 shows how a correct head may be formed from Fig. 2 by cutting off one branch and the top of the remaining one.

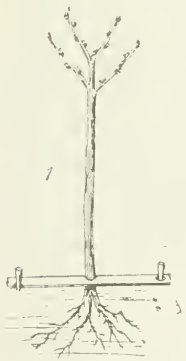


Fig. 1.

Fig. 2.

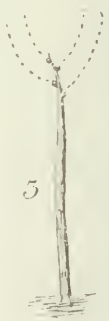


Fig. 3.

As to varieties, at the present time winter fruit is the most profitable for commercial purposes for growers situated as we are at a distance from all large markets; but with a good system of cold storage in proper working order I believe that some good fall varieties, such as the Wealthy, would give better returns on account of their flavor and great productiveness than the longer keeping and less productive winter varieties. But as a continuous system of cold storage is still almost in an experimental stage, it is impossible to predict what the future may reveal in regard to the most profitable apple for shipping to the British markets. However, it is always safe to plant a good percentage of some hardy, long keeping sort such as the Baldwin. For a number of years the King has commanded the highest price of any apple in the market, but its habits of shy bearing and premature dropping detract much from its value. Its producing capacities, however, can be greatly increased by top-working it upon some good thrifty stock. A knowledge of grafting is something that every fruit grower, and every farmer too, should possess, as

by this means many trees which are now worse than useless might be converted into valuable ones. Whatever varieties are chosen for planting they should be confined to but three or four different ones. This is important, for while shippers are anxious to purchase and willing to pay extra price for a large number of barrels of three or four good varieties, they will pass by almost unnoticed a job lot of two or three barrels each of fifteen or twenty different sorts. But while it is well to plant only a few varieties no single one should be grown in a solid block, as the belief is now quite general that some varieties, such as the Baldwin, are not wholly self-fertilizing.

After the orchard has been carefully set out it should not be neglected, as is too often the case, for it is only by the most diligent and careful attention that satisfactory results are obtained. A tree is similar to a young animal—the care and attention it receives during the first year or two of its life has much to do with its future usefulness. The trees should be protected from mice and rabbits by placing around the trunks pieces of sheet iron or fine wire netting rolled in the form of a tube twelve inches long and four in diameter. They should also be carefully guarded from all stock while young, as I believe I am safe in saying that twenty-five per cent. of all trees set out are ruined in this manner. For the first few years each spring just after the frost is out of the ground all leaning trees should be straightened up and again leaned slightly toward prevailing winds and the ground tramped firmly about their base. By timely attention to such details the unsightly appearance which so many orchards present will be guarded against. For the first eight or ten years the ground should be kept perfectly clean by frequent cultivation, although a hoed crop may be grown each year if care be taken to replace as much plant food as is removed from the soil. For the last five years we have grown small fruit in our young orchard of two hundred and fifty trees, and it has proved a benefit rather than an injury to them. The frequent shallow cultivation given forms an earth mulch which is an important factor in conserving moisture during the dry seasons, and the rapid growth our trees have made as a result is very gratifying. And right here I wish to state that I believe that the value of an earth mulch as a means of conserving moisture is too little understood not only in fruit growing but in general farming as well. Scientists tell us that moisture rises in the soil by capillary attraction, which process is thus explained: When a clean glass tube with a fine bore, open at both ends, is plunged into a liquid capable of wetting it, the liquid is found (1) to rise in the tube above the level of its surface in the vessel containing it; (2) to rise higher in the tube above that level the finer its bore is. Now, in the soil there is a constant tendency to form these microscopic tubes, through which the moisture from below is drawn to the surface and evaporated into the air. By frequently stirring the surface of the soil these minute tubes are broken so that evaporation is checked and the moisture stored beneath this earth mulch where it can be utilized by the rootlets of the growing plants instead of escaping into the atmosphere. Thus it is that cultivation is always necessary after heavy dews or showers, for the wetting of the surface forms a crust which tends to restore the normal conditions. This explains the reason why a straw mulch is so valuable in conserving moisture, for while the moisture is attracted through these minute tubes to the surface the straw prevents it from evaporating into the atmosphere. But while it is possible to use a straw mulch upon a limited area only, the earth mulch can be used to an unlimited extent. Some experiments which were made in this line showed the result that upon an acre of light soil where frequent cultivation was given to a depth of one and a-half inches, the evaporation of water was 2,500 pounds less per day than upon an acre of similar soil receiving no cultivation. On heavy clay soil this difference amounted to 4,000 pounds per day per acre. What wonderful opportunities for overcoming extremes of season a knowledge of the scientific principles of tillage and drainage opens to the progressive farmer and fruit grower! I believe if we farmers were to study more science of this nature and put our knowledge into practice, we would find that book farming, as some people term it, is something more than theory.

Although I believe that every young orchard should be kept under cultivation, still, after the trees have attained some size and begin to bear well, I see no objection in seeding to grass if it is not allowed to form a tough sod. The trimming of the trees should

commence soon after they have been set out. They should be gone over two or three times each year, and every branch that intersects another, or is inclined to grow toward the centre of the tree, should be cut out, as this will save the lopping off of large limbs in after years and will keep the centre of the tree well open, thereby facilitating the work of spraying and gathering of fruit. In pruning, the form of the tree can to a great extent be controlled by the exercise of a little observation and judgment. If some of the limbs are inclined to grow faster than others so as to give the tree an unbalanced top, they should be checked by cutting back; or if a limb grows out of the desired course so as to leave too large an open space, by cutting the limb back and leaving the last bud on the side toward the opening, the growth can be diverted in that direction so that in a short time a symmetrical head will be formed. Winter pruning tends to encourage wood growth and the general building up of the tree; while summer pruning performed in the month of June, about the time the leaves are two-thirds formed, stimulates fruit production. For general pruning, I would advocated having the work done during the warm days of late winter or early spring, but never during very severe cold weather, as I am convinced that several orchards in my immediate neighborhood, trimmed by a professional pruner, were entirely killed by severe pruning when the mercury was near the zero point. One important point to know in purchasing young stock is that root grafted trees will not usually sucker from the root, while crown grafted ones are very bad in this respect. We have a number of trees of the Wealthy variety which were crown grafted and they give us much trouble from this cause. There are many old orchards in every locality that might be renovated by judicious pruning and fertilizing, but one should not make the mistake of piling manure around the trunks of the trees where its substance is almost wholly unavailable, as the feeding rootlets of a tree, through which it obtains the greater portion of its nourishment, extend out as far or farther than the spread of its branches.

In regard to spraying, I believe that every owner of fruit trees should have a good spraying outfit, and do everything in his power to exterminate the insects and fungus pests which are the greatest of all drawbacks to successful fruit growing. It is only by united action in this work that lasting results can be secured. It is true that through some cause the codling moth did less damage the past season than for many previous ones, but it will soon increase again, and its present scarcity is a strong argument for united effort for its complete extermination. The spraying solution we use is composed of 4 pounds Copper Sulphate, 4 pounds Lime, 4 oz. Paris Green, and 50 gallons of water. This is a complete remedy both for insects and fungus pests. The first application should be made just after the blossoms have fallen, and should be followed by two others at intervals of eight or ten days.

In conclusion, I would add that if time cannot be had for giving the orchard the care and attention it demands, the work of setting it out had better never be begun, for, although a well cared for orchard will return a large dividend for the amount invested, there are already too many neglected orchards that do not pay for the land they occupy.

RASPBERRY CULTURE.

By Ellis F. Augustine, Aughrim.

Raspberries may be successfully grown upon any land that will produce a good crop of roots, although a dark sandy loam is preferable to all other soils. To obtain the best results the land should be in a good state of tilth, and should be thoroughly drained either naturally or artificially, as a cold, wet soil is particularly addicted to the development of fungous diseases to which the raspberry is very subject. A clover sod, or land that has previously grown a hoed crop, is most suitable, and if possible it should be plowed in the fall and a heavy coat of stable manure turned under to supply nitrogen. In the spring a liberal top-dressing of wood ashes should be applied to furnish phosphoric acid, lime, and potash; of the latter the raspberry is a large consumer. Then the land should be thoroughly pulverized with a disc harrow and a smoothing harrow, when it will be in the

best possible condition for receiving the plants. These should be procured from some reliable near by grower, as personal observation and advice can thus be had as to the varieties most suitable for your particular soil and climate, and plants thus obtained will take root much more readily than those which have been shipped a long distance.

In our estimation spring is much preferable to fall for planting, but the work should be done just as soon as the ground can be put in good condition, as there is then less danger of the young shoots being broken off which begin to grow very early in the season. When conveying the plants from the nursery to their new location, care should be taken to keep the roots constantly covered with damp straw or blankets, as a half hour's exposure to wind or sunshine may prove fatal to them. One mistake which is usually made in setting out small fruit plants, is in placing them too close together. The rows for raspberries should be seven feet apart, and should be as long as possible to facilitate the work of cultivation. The plants should be four feet apart in the rows, but the red varieties may be allowed to form a new stand of canes between each two plants set; all others should be treated as weeds and cut out. This distance allows ample room for horse cultivation, and economy of time and labor is of more importance to the general farmer than a few additional rods of land. Before setting the plants the roots should be immersed in a pail of water, and this will cause the fine lose earth to adhere to them, when they will start growth much more readily. The holes for the plants should be made sufficiently large and deep to admit the fibrous roots without crowding, and the soil should be firmly compacted about the canes. This firming of ths soil is an important point in setting out all kinds of plants or trees. The first season a row of low growing vegetable such as potatoes or beans may be grown to advantage between each two rows of the bushes. Frequent shallow cultivation should be given, and especially after showers of rain, as this will form an earth mulch which will serve to check evaporation and assist in retaining moisture. About the first of September, or soon after the vegetables have been harvested, the ground should be lightly ridged up to the plants with a one horse plow, leaving a furrow between each two rows of bushes. This protects the roots of the plants during the winter time and allows all surface water to flow rapidly away.

I shall describe the method we use in pruning the bushes. In the charts Fig. 1 represents a bush of the black-cap variety which has been left untrimmed. You will

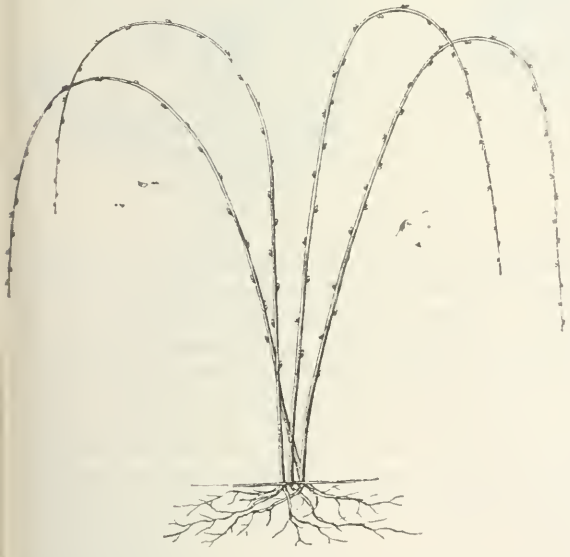


Fig. 1.

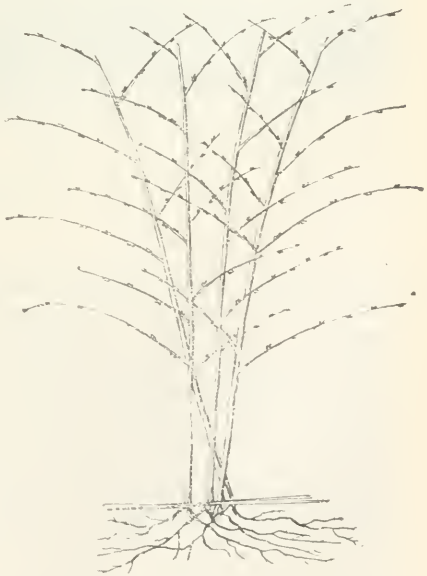


Fig. 2.

notice that the canes have grown very tall and spreading, and if left in this form they would prove a great drawback to cultivation and gathering the fruit, which would also be

much soiled by drooping to the ground when the canes are heavily laden. Tying the canes to stakes is sometimes resorted to, but this is impracticable when a large acreage is grown. If the canes were cut back in spring at a height of say four feet, it would leave very little wood for fruit production, as there is but one fruit bearing stem produced from each bud. Fig. 2 illustrates our method of pruning. The new canes are cut back at the height of two and one-half feet some time during the month of June. This causes them to become strong and stocky and throw out a lateral branch from each bud on the main canes. These branches sometimes grow to the great length of ten or twelve feet. The following March or April, after severe freezing weather is past, we clip these with a hedge shears to eighteen or twenty inches in length. This leaves an abundance of wood for fruit production and gives the bushes a nice circular form about three and one-half feet in diameter, thus affording every facility for cultivation and gathering the fruit.

As soon as the soil is in fit condition for working, the ridges should be cultivated back to a level again and shallow cultivation should be continued until just before the fruit begins to ripen. As soon as the fruit has been harvested, the old wood should be cut out, removed and burned. By using a V. shaped steel hook for cutting out the wood, a horse attached to a wooden rake for gathering it into bunches, and a sled for hauling it away, this work is much simplified. When this has been accomplished, the ridging up should again be done. Doubtless many who are present have attempted to grow raspberries, and have noticed the bushes become sickly after a few years and soon die out altogether. This is usually caused by a fungous disease known as anthracnose. It is contagious, is carried in the air, and is most prevalent during a wet season. Fig. 3 in the charts illustrates a section of cane very badly affected with anthracnose. The first symptom of the disease is the appearance on the young canes, from the first till the middle of June, of small white pits or indentures, surrounded with a dark bluish circle.

Fig. 3.

Fig. 4.

These pits soon enlarge and spread over the canes, until in severe cases they are entirely girdled. It also affects the foliage in the form of dark brown or reddish spots, sometimes containing a light centre as shown in Fig. 4. These spots quickly enlarge and cover the whole surface of the leaves, when they dry and curl up, giving the entire patch the appearance of having had a fire pass over it. When the foliage of a few bushes in a plantation become affected, it rapidly extends itself to others, and in this way will run over several acres in the course of five or six days. In some cases, the bearing canes entirely dry up, while in others, where they still retain sufficient vitality to ripen the fruit, it is much diminished in size and is dry and tasteless. The remedy, or rather preventive, for this disease is to spray the canes in spring, before the buds begin to burst, with copper sulphate solution, composed of one pound copper sulphate or blue vitrol, and twenty gallons of water. This should be followed by three or four later sprayings at intervals, before the fruit begins to form, with bordeaux mixture composed of five pounds copper sulphate, four pounds lime, and fourty gallons of water. We use a barrel sprayer drawn by a horse, and having two lines of hose attached and two finely distributing nozzles, so that one side each of two rows of bushes can be sprayed as fast as the horse can walk.

As to varieties, after testing quite a number we have discarded all but Hilborn and Gregg in black, Schaffer's Colossal in purple, and Marlboro, and Cuthbert in red. All of these I can highly recommend for this locality.

To sum up, success in raspberry culture lies in thorough drainage, judicious fertilizing of the soil, selecting suitable and hardy varieties for planting, frequent shallow cultivation, systematic pruning, and persistent warfare against fungous and insect enemies.

FARMER'S SMALL FRUIT GARDEN.

By W. W. Hilborn, Leamington.

There is still a large majority of the farmers who do not grow small fruits for their own use. I have heard many of them say that they could buy cheaper than they could grow them. Every farmer can grow them for less than one half the price they have to pay when buying. Besides, if they depend on buying, the family have to go without the fruit in most cases, or perhaps have a few for a treat several times during the season. Any farmer who does not grow all the small fruits the family can use during the summer, does not live up to his privileges. No other class in the land can have them so cheaply. It takes but little work to grow a sufficient quantity for any family if properly planted and attended to at the proper times. Select a well drained soil. Clay loam is preferable for the strawberry, currant, and gooseberry, and a sandy loam is most suitable for raspberries, blackberries and grapes. Either kind of soil will answer, but always avoid a heavy clay. Any soil that is rich enough to grow a good crop of potatoes or corn, is rich enough for small fruits.

Preparing the soil. Plow in the autumn. In the early spring, as soon as the land is dry enough to work up nice and mellow, it should be stirred deeply with a cultivator, then harrow down and mark off in rows, after which it is ready for planting.

Strawberries. Plant as early in spring as the weather and soil will permit. The rows should be four feet apart, and the plants two feet apart in the rows. Use the spade to make the openings for the plants, which should be deep enough to admit the full length of the roots without doubling. Set the plants at the same depth as they were in the original plantation. Protect the plants while out of the ground by covering slightly with moist earth. When planting, spread the roots out fan-shaped, and pack the soil in very firm around them. When the fruit stems shoot up pinch off, also pinch off all runners until the plants have gained sufficient vigor to send out three or four runners at once, when they may be allowed to take root and form a matted row. Start cultivating as soon as weed seeds begin to grow, and repeat often during the growing season. When the ground freezes in the fall, mulch with straw or coarse manure. Put most of the mulch between the rows and but little directly over the plants. In early spring, rake off any portion of the mulch that covers the plants and allow it to remain between the rows to keep the soil moist and the fruit clean. Put out a new plantation every spring, as this can be done more cheaply than to clean out the old one.

Raspberries. These should be planted as early as possible in the spring, in rows six to eight feet apart. The richer the soil the greater should be the distance between the rows. When the new growth is about a foot and a half high, pinch off about four inches of it. This will cause the canes to branch out and form a nice round top. No other pruning is required the first season. In early spring cut back the lateral branches to about one or one and a half feet. As soon as the fruit is gathered cut out the old wood. The second season, and each succeeding year, the new canes may be allowed to grow to two and a half feet before pinching back, and the laterals in spring may be cut back to one and a half or two feet.

Blackberries. These can be grown after the same method as the raspberries except that the canes grow much stronger and require to be farther apart and may be allowed to grow a little higher before pinching back.

Currants and Gooseberries, may be planted four by six feet apart. Plant in autumn if convenient, otherwise as early as possible in spring, as they begin to grow very early. Allow several stalks to grow in each hill, and as the bush grows older cut out the oldest wood and allow new canes to grow up and take the place of those removed. In this way the bushes can be kept young and vigorous for many years. Every season, cut out any weak or surplus branches and prune back the new wood one-third to one-half. Most of the fruit grows on two year old wood. Cultivation should cease about midsummer with all small fruits, (except the strawberry) to ripen up the fruit buds, otherwise the crop of fruit may dry up instead of ripening on the raspberry and blackberry bushes. Below I name a few good standard varieties of small fruits that succeed in most localities :

Strawberries.—Wilson (B), Williams (B), Beder Wood (B)—Perfect ; Crescent (P), Bubach (P)—Pistillate.

Raspberries.—Cuthbert, red ; Golden Queen, yellow ; Schaffer, purple ; Hilborn, black.

Blackberries.—Snyder, Agawam, and Taylor's Prolific.

Currants.—Raby Castle, red ; Fay's Prolific, red ; White Grape, white ; Champion, black ; Lee's Prolific, black.

Gooseberries.—Downing, green ; Smith's Improved, green.

HORTICULTURE ON THE FARM.

By G. C. Caston, Craighurst.

When we advise the farmer to grow small fruits for his own use, we are invariably met with the objection that there is no time to attend to such things. The orchard in many cases is left to take care of itself ; how can there be any time to care for the small fruits ? In times past, when nearly all the work of the farm had to be done by hand, and even in the present day when there are no boys to help with the work and all labor has to be hired, this objection is a very plausible one, for the seasons are too short for the amount of work to be done. But where there's a will there's a way. Then it will pay. Yes, we can prove that it will, and also show that it is not such a formidable business as most people imagine. The mistake is made, when anything of this kind is attempted, in planting the small fruits in an enclosure where all the weeding and cultivation has to be done by hand. This is certainly an expensive and unsatisfactory way, and generally leads to disappointment and failure. Prepare a piece of land in the open field where the fruits can get the benefit of a free circulation of air and plenty of sunshine, and where the cultivation can be mostly done with the horse and scuffler. A strip of land about four rods wide and ten or twelve rods long will grow enough to supply a large family with an abundance of fresh fruit in season and plenty for canning besides. This small strip of land should be well prepared before planting, well fertilized and cleaned. There should be three rows of strawberries. One of these rows should be planted with a staminate variety. A very good selection for home use would be Beder Wood and Williams for early and medium staminate varieties ; and Haverland, Crescent and Bubach for pistillate. Beder Wood would blossom with Crescent, and Haverland with Bubach. The land should be plowed in the fall and worked with a spring tooth harrow in spring. Get good healthy plants ; remove any old runners and rusty leaves, leaving only the healthy green leaves. Plant fifteen inches apart in the row, and have the rows not less than 42 inches apart. The planting is easily and speedily done. Mark the rows with a marker or stretch a garden line ; take a spade and drive it down with the foot, push the handle forward and take the plant in the left hand and insert it behind the spade. Be sure that the roots are all turned downward. Pull out the spade with the right hand, and at the same time place the right foot in front of the spade, and press down the soil firmly about the roots of the plant. See that the crown of the plant is not covered. Cultivate

often and shallow. Remove blossoms and do not allow them to bear fruit the first year. At any time through the summer (except at fruiting time), when using the scuffler go through the rows of fruit; do not wait until they get weedy, cultivation always helps them. They will form matted rows and the width of these can be regulated by the scuffler. It will take care of the runners and keep them in place. It is not well to allow the rows to be more than about fourteen inches wide for best results. After the ground is frozen hard in the fall, cover the plants with some kind of litter for protection; have the plantation clean, and before fruiting, spread some short straw or other litter under the vines to prevent the fruit from getting sanded by heavy showers.

Raspberries are less trouble than strawberries, as a plantation will last for several years, while strawberries require to be renewed every two years. There should be three rows of raspberries, two of red and one of black-caps. They should be planted three feet apart in the row and the rows should be six feet apart. Plant in the spring and give frequent cultivation. Varieties: Marlboro', Cuthbert and Columbian for red; Hilborn and Older for black. The Columbian is a new variety, a cross between red and black, and propagates from the tips like the black-caps. It is a prodigious bearer. Shaffer's Colossal is also a cross, resembles Columbian in color and is an excellent berry for canning for home use. I would only plant a few Marlboro' for early fruit, and have the largest quantity of the red berries of the Cuthbert. This variety stands at the head of all the reds for quality, and for using fresh on the table it has no peer. When the canes are about thirty inches high, pinch off the top and stop them. This causes a stout, stocky growth, and a number of laterals which should also be pinched back if too long. This system is much better than allowing the canes to grow to a great length and sprawl all over the rows. It will also give better fruit. About seven or eight canes should be allowed to grow in each hill every year and the rest treated as weeds. Cut the old canes out every year either in the fall or early spring. Keep the rows clean up to fruiting time, and cultivate often and shallow. With the Cuthbert, which is a trifle tender, it is well to cease cultivation after fruiting, in order to ripen the wood early before winter sets in.

Currants and gooseberries are easily cultivated and propagated. They should be planted about four feet apart in the rows and the rows five feet apart. Keep the ground clean by shallow cultivation; prune sufficiently to keep bushes open to sun and air, and keep in symmetry. Some get the best crops by first keeping the ground perfectly clean till the bushes begin to bear, then mulching heavily all over the ground to keep the moisture and prevent the growth of weeds.

Red currants: Fay's Prolific and Cherry. White: the White Grape. Black: Black Naples, Lees' Prolific and Saunders. Gooseberries: Houghton, Downing and Pearl. For the mildew of the gooseberry and black currant, currant worms, and for the anthracnose and rust of the raspberry, there is nothing so effective as spraying with the Bordeaux mixture, with four ounces Paris green to forty gallons of the mixture, same as is applied to the fruit trees after the blossoms fall. They should be sprayed at least twice before fruiting.

The remaining part of the plot may be planted with tomatoes, a plentiful supply of which, ripe and fresh, should be raised by every family. By sowing the seeds early in boxes in the kitchen and transplanting them into a hot-bed or cold frame, they can be made to ripen early, so as to have ripe tomatoes from the end of July until the frost comes. The strip occupied by tomatoes can be planted the next year to strawberries to keep up the rotation. If there is any place where commercial fertilizers may be used to advantage, it is on the small fruit plantations, as there we get no foul seeds and clean cultivation is easier. This little strip of fruit land will, if properly managed, give more value in return for the work and expense put on it than any piece of equal size on the farm; yes, twice over. I contend that farmers are in a position to enjoy more real luxuries than any other class; for by the exercise of a little skill, judgment and energy, they get everything fresh from the hand of Nature. They may have fresh rich milk and cream, pure sweet butter, fresh eggs, a rotation of all the fresh vegetables,

green peas and corn and fresh ripe fruit the year round. Pears and grapes may be kept well into the winter and apples till the strawberries are ripe, or if a gap should occur here, it can be filled with the delicious maple syrup by anyone owning a few acres of maple bush. In fall or winter when no fresh berries are available, what so delicious or wholesome as a dish of baked apples with sweet cream and sugar. Good for dyspepsia, you say. Yes, the very best prescription you can get. Eat less meat and rich food, and use more fresh fruit and milk. Make fresh fruit a part of your diet all the year round, and you will have little use for doctors or patent medicines. And who is in a position to enjoy these things at so small a cost as the farmer, and the farmer who is not enjoying a good big share of them is not living up to his privileges.

I have not mentioned here the black or thimble-berry. In many locations the wild varieties are so plentiful that there is no necessity for their cultivation, but these patches of wild berries do not last long, and the cultivated varieties may be grown in the same way as the raspberry. Varieties: Snyder and Agawam will succeed in most localities.

I have not mentioned any of the tree fruits that come in regular succession. Time and space will not permit of dealing with them in detail, but they should have a place on every farm, and will well repay the care and attention bestowed on them. There is another branch of horticulture that I think is worthy of our attention, that is, the beautifying of our homes by the cultivation of flowers, in pots and by window gardening. This part will come under the care and management of the wives and daughters, who will be only glad of the chance to exercise their skill in home adornment. I see no reason why a farmer who is able to build a good large comfortable, house heated by means of a furnace, should not have a small conservatory on the south side, which would cost but little extra, and could be heated from the furnace. This, when once stocked and cared for and manipulated by the farmer's wife and daughters, would be "a thing of beauty and a joy forever." These are some of the things that make homes happy. Music in the home, good wholesome literature, the enjoyment of all the luxuries Nature provides—why should not the farmer's family be surrounded by everything that delights and adorns existence? They should have a pecuniary interest in the products of the farm, and bear part of the responsibility as well. They should be early taught that upon the skill, energy and judgment they exercise in controlling the forces of Nature, will their success as agriculturists depend. That their home life is really the best and most enjoyable, and their life work the most important that can engage the skill and best energies of mankind.

THE BEST MARKET VARIETIES OF FRUIT.

By E. Morden, Niagara Falls South.

To the intending fruit grower the best market varieties is a question of great importance. I propose to give a list which succeeds in my own locality Some modifications will doubtless be necessary for different soils and climates. As the grower for home consumption usually wants good fruit and plenty of it, the best market varieties will best suit him in most cases. Bubach strawberry is a large, sweet berry. The late pickings maintain the size of fruit unusually well. The plant is a very strong grower. It needs an occasional row of pistillate berries to fertilize it sufficiently. The Williams is a pistillate variety that produces an abundance of plants and of handsome large berries. I have discarded scores of varieties and am testing others. Of the newer varieties, the Grenville is promising. In red raspberries, I grow Marlboro' and Cuthbert. They are large, firm, handsome berries of good quality. The Golden Queen is light golden colored. Cuthbert is similar to it in every way. The Gregg Blackcap, a large, firm producing berry and a good grower, leads with us. I know of no large blackberry (thimbleberry) of good quality produced on a hardy cane. Agawam, Snyder and Taylor are medium sized berries, sweet and good in quality, and are produced in large quantities on dwarfish canes that may be called hardy in this climate. Blackberries are fastidious as to soils. While I am satisfied that Snyder blackberries lead in some locailties, they have not done so well in this locality.

The White Grape currant is a handsome fruit of the best quality but rather a poor seller. It is not a good grower. The Raby Castle is a strong tree-like grower and much more productive than the Cherry or Fays. Fays currant is a poor straggling grower with usually a small crop of large fruit. The Cherry currant is a better grower, and I think equally productive. In Black currants, the Naples is the best so far. Black Champion is too much given to leaf rust. The blossoms of the black currants commonly fail to produce fruit, hence much disappointment. Some minute fungus may be responsible for this.

In grapes the Concord still leads. The Morden, a seedling of the Concord, is larger, earlier and better than the Concord. It produces fine bunches. For home use the Morden is ahead of the Concord. For shipping the Concord is preferable. Scores of varieties of grapes have been much praised, but none of these that I know of can be generally recommended.

The Early Richmond is a good general purpose sour cherry. The sweet cherries may be grown in some parts of southern Ontario, but they are not generally reliable.

In white plums the Imperial Gage and Reine Claude stand in the front rank. Washington is a beautiful, large, early white plum tree, but a slow grower. Lombard altogether overdoes the plum-producing business and is a prime favorite. I think well of Niagara or Bradshaw and Shipper's Pride among the purples Some of the Japanese plums are promising. Abundance is now fairly well known. Ogon is very early and of poor quality. One that comes to me as Hytankia resembles Lombard in appearance, and is very handsome and of fine quality.

Clapp's Favorite, Bartlett, Flemish Beauty, Seckel, Sheldon, Anjou, Duchess d'Angouleme, Lawrence and Keiffer are well known pears. Bartlett has been over planted. Flemish Beauty is liable to crack and lacks the popular yellow color. Seckel is small but of the best quality. Keiffer is a fine grower and a prodigious bearer. As grown in some places the fruit is of doubtful quality.

There are many apples. For summer and early fall, Red Astrachan, Dutchess of Oldenburg, Gravenstein and St. Lawrence are largely planted. Greening, Spy, Baldwin, King, and the Russets are well known. Ben Davis is the leading long distance shipper. Like some other beauties its quality does not equal its appearance. No one with limited room or limited means should notice varieties. Stick to staples. The average town lot owner fills his limited space with high priced novelties. He anticipates much, but participates in a very small way. Plant well tested varieties and then you may eat the fruit thereof. Let some one else test his imagination upon some superior humbug, while you eat fruit of varieties long since proved to be good.

THE GRAPE AND ITS CULTURE.

By W. M. Robson, Lindsay.

Prior to entering on my subject permit me to briefly preface this paper by showing the importance, the extent and the relative value of the fruit industry to Canada by a comparison with what is known as staple products. Three years ago at the annual meeting of the Fruit Growers' Association held in Peterborough, Prof. C. C. James, Deputy Minister of Agriculture for Ontario, made this statement, that there were 7,000,000 bearing apple trees in Ontario; 2,000,000 grape vines, 700,000 plums, 500,000 each of cherries, pears, and peaches, and that the value of the product of these trees was approximately placed at $20,000,000; while the value of last year's wheat crop was $15,000,000, and of cheese product between $9,000,000 and $10,000,000. This estimate is said to be at moderate prices. Since then fruit cultivation has been extended by leaps and bounds, for at the present time it is said that the grape vines in Ontario alone have made such a phenomenal increase as to nearly reach 4,000,000. This speaks

volumes for our climate and its resources, showing that the introduction of fruit growing as a branch of mixed farming may to some extent be adopted with pecuniary advantage on suitable land, therefore, worthy of consideration, for it is assuming vast importance in many sections. The present depression in prices appeals to our judgment as to the necessity of conforming to changing conditions, and we may to some extent endeavor, in a preparatory way, to increase our horticultural knowledge at Farmers' Institute meetings, for fruit growing in connection with agriculture may be made a profitable auxiliary. While it may not be advisable in this neighborhood to represent it as a desirable staple product in all cases and places, or a panacea for all the evils that affect husbandry, yet combined it weilds an influence and inspiration that appeal to our higher nature, for it has (imperceptible though it may be) elevating, refining, and refreshing qualities. Pleasant and desirable as a home necessity, always interesting to the boys, tending to keep them at home, fruit has also sanitary properties and numerous other benefits, which, I trust, is sufficiently interesting to claim your attention to this selection of one species of fruit,—the grape.

My object in selecting this subject was particularly on account of lack of knowledge and interest by a large portion respecting the cultivation and treatment required to succeed in growing grapes in this locality. I shall be pleased if I can enlist sufficient interest to give expression and ideas respecting the probabilities of growing successfully here this the most beautiful of all fruits. I will venture to say that anyone here anxious to grow this fruit will be fairly successful, when the conditions and requirements are attended to, such as I will endeavor to describe in this paper, as this excellent fruit, for none is more refreshing or more healthy, can be grown over the greater part of Ontario and very extensively in parts of the Province of Quebec. For example, in and around Ottawa and Montreal it is cultivated by the acre, both for pleasure and profit. This should be encouraging to anyone who possesses a suitable plot of ground to add to his home the attraction of a vine covered verandah, bower, or trellis, with the possibility of enjoying this delicious fruit on his table three or four months in the year. This is not too highly colored, but can be practically realized under favorable climatic conditions here in this town and vicinity. I may just add in passing that thousands of individuals on this continent have tried to cultivate the European grape (Vitis Vinfera) in open vineyards, and tens of thousands of dollars have been spent, but all have failed up to the present on this side of the Rocky Mountains. But great and continuous success has accompanied the cultivation of our indigenous grapes of the Vitis Riparia and Labrusca family, by cross hybridizing with the European grape, giving quality, size, and appearance, with a yearly addition of new candidates for place and position. We may reasonably hope for the dawn of better times if by cheap and quick transit grapes can be placed on the English market in such condition and at such a price that will captivate and cultivate the tastes of the middle and lower classes. This once accomplished it would insure a great demand for this fruit in the world's market. The average yield on good grape land with proper attention is about four tons per acre, with a maximum of eight or ten per acre, so that the country's capabilities in this line would not be easily exhausted. This one phase of the vine; we will now view it from another aspect.

The grape vine is supposed to be a native of Asia, and is said to have followed the footsteps of man from the shores of the Caspian Sea, intertwining its tendrils with civilization and refinement in every age. It may be found in Europe from the Tropic of Cancer to the Baltic Sea; in America from the Gulf to some distance north of our Ontario Lakes. It is nevertheless fastidious in its climatic conditions, and has its seasons of success and partial failure. Success depends entirely on meteorological influences, as the following quotations will show: No matter how excellent the soil if there is less average than fifty-five degrees of temperature for the growing months of May and June, and a less average than sixty-five degrees for the maturing months of July, August, and September, there can be no hope of success; but when the temperature averages sixty-five for the growing months and seventy-five for the maturing months, other conditions being equal, then fruit of the greatest excellence can be raised and wine of the best quality can be produced. The grape is even more particular about moisture, for where there is an

average rainfall of six inches for the months of April, May, and June, and an average of five inches for the months of July, August, and September, all other conditions favorable, we cannot succeed in raising grapes. But when the average rain fall for the first months is not more than four inches, and the average for the latter not more than two or three inches, other conditions favorable, the finest varieties we have can be successfully grown. There is no country in the world where all kinds of grapes will succeed, and different countries of necessity cultivate different kinds, such as they have found best adapted by long experience to their soil and climate. The native southern grape will not succeed in the north, or the northern native succeed in the south. Indeed, it is known to grape growers that even the line fence or roadway between often determines success or partial failure, simply illustrating that the finer the article the more capricious and exacting it is in its demands; but practical experience and labor conquers all things.

The location ought to be the best you have at your disposal, good and dry with an open exposure. The best soil is a dry calcareous loam, sufficiently deep, loose, and friable, draining itself readily, as the grape is impatient of wet feet; or a good rich gravelly loam. While such is described as the best the amateur will have to come as near as conditions will allow, ever remembering to have your land in good tilth before planting, as it is much easier and cheaper before than afterwards. All being ready we will introduce the vine, which should be a good healthy two-year-old vine with good fibrous roots, transplanted where it is intended to grow in the spring. If planting a quantity, the distance apart ought to be from ten to twelve feet each way. At the end of the first season, say about the last of November, this young vine will have made a growth of from two to three feet if healthy. This should be cut back to two or three buds and covered over with a shovel or two of earth. In the following spring about the 1st of May uncover and the vine will soon start into growth, and by pruning time in the fall it may have branched out two or three yards, which will have to cut back to within three buds of the new growth, and all canes cut off excepting two for forming arms. These are preparatory to training the vine by what is known as the fan system, those canes to be laid down and covered with a few shovels of earth again and in the spring uncovered. Trellis may now be constructed in the following manner,—get good cedar posts eight feet long, and put them three feet into the ground at about fifteen feet apart. Next stretch three or four rows of No. 10 or No. 12 galvanized wire horizontally along the posts, the first one about eighteen inches from the ground; the others may be at equal distances up to five feet secured at each post with a small staple; this makes the neatest of all trellis. The vine is entering on the third season and ought to bear fruit. The two horizontal canes left in the fall may now be tied to the first wire with any soft string, or the proper material roffa, which can be bought at any seed store. These canes will soon throw out laterals on which fruit will appear. Now, in order that the vitality of the vine may not be expended in wood making, pinch back to the second leaf from the bunch of fruit, and continue to pinch with this aim to keep the vine equally balanced in fruit, foliage, and wood. What perpendicular canes you find necessary must be kept tied to the wire, and should they be inclined to ramble over the top wire, pinch them back to it.

The vine has now entered on its fruit bearing year, and there are two things to be attended to,—good clean cultivation and pruning. Prune judiciously, but fearless pruning is probably the most important art to master in vine cultivation, and this part is often done carelessly without method or system. It cannot be taught by theory, nor can cast iron rules be laid down for anyone's guidance. It is estimated that there are between four and five hundred systems of vine dressing practiced throughout the world. Every vine grower soon becomes aware of the requirements of the different varieties as they differ so much in growth and character. In order to understand the art of pruning you must prune, which will have to be done regularly every fall, cutting back the new growth to two or three buds on the horizontal arms with a view of making healthy bearing wood for next year.

Fertilizers. If the ground was in good condition when planted you can dispense with barn-yard manure for two or three years by giving it a coat of unleached ashes;

then if the vines show a lack of vigorous growth give a dressing of manure, afterwards fertilize according to wood and foliage.

In gathering the grape, whether for table or market, do not pick before it is ripe, for unlike other fruit it does not improve after being gathered; when thoroughly ripe the stem turns brown and shrivels somewhat. It only attains its highest excellency and rich aroma when fully matured. Gather the grape in fine weather, and wait until the dew has dried off in the morning before commencing. Cut off the bunch with a sharp knife or grape shears, carefully cutting out all unripe or diseased berries, and endeavor to retain the beautiful bloom.

The keeping qualities, and how to keep them until midwinter. The black grape will not keep under ordinary conditions very long. Most of the red grapes and some of the white ones can be kept until midwinter very well by careful management. The kinds known in this neighborhood as keepers are Agawam, Lindley, Salem, Vergennes, Deleware and Brighton; among the whites, Duchess and Moore's Diamond. The methods are numerous as fancy or convenience may dictate, but all must have a low temperature, just above freezing. A very simple and effective mode of keeping them is to put them in ordinary pasteboard boxes with covers on (these can be got from dry-goods stores after having been used.) Lay them in single layers and keep in a cool, dry atmosphere, and there will be no trouble in keeping grapes until the holiday season in winter. It may be interesting to name a few of the kinds that succeed very well in this part of the country with special respect to being early, hardy, and of good quality. With regard to practical knowledge in this respect, it may be pardonable for me to tell you that I have been cultivating grapes for nearly twenty years and during that time I have fruited thirty different kinds. With grapes as with other fruit there are old reliable kinds that retain their popularity. In black grapes I would recommend the Concord, Worden, and Roger's Wilder, Herbert, and Barry. I might have mentioned the Champion, a grape that succeeds and ripens everywhere in this locality, but the quality is poor. In reds, Agawam, Delaware, Brighton, Lindley, and Vergennes. In whites, Niagara, Moore' Diamond, and Green Mountain. These are all reliable in this vicinity.

FORESTRY DEPARTMENT.

THE FOREST TREE IN ITS RELATION TO THE FARM.

By W. T. Macoun, Foreman of Forestry, Central Experimental Farm, Ottawa.

Could the red Indian, who roamed through the forests of Ontario two centuries ago, return and view the thickly settled parts of the Province, where farmers, after years of toil, have made themselves comfortable homes, he would find but a scanty remnant of those noble woods in which he hunted for his daily food. Even our grandfathers, who built their log cabins in the backwoods of their day, tell us thrilling tales of adventures in the forest. But the axe fell, the fires burned, and the trees were doomed.

In the early years, when the country was but beginning to be settled, fires ran unchecked through miles of timber land, leaving behind but blackened and desolate remains of the primeval forest ; and where fire did not destroy the trees, the white man, who must have other food than nature can supply unaided, played his part in their ruin ere he could grow his crops. Had the country been all settled at one time more judgment might have been shown in the destruction of the trees ; but the farmer saw miles of forest all about him. What need then to save his own trees, which cumbered ground that might be devoted to more paying crops? The result is now all too apparent. Travellers from Great Britian and the continent of Europe, when journeying through the older settled parts of the Province, are surprised at the scarcity of trees, and the remark is often made that they have more at home.

Preservation of the Farm Woodland.

Farmers who foresaw the scarcity of timber in the years to come left a few acres uncleared, and their grand-children to-day are reaping the results of their wisdom. Unfortunately, however, in too many cases, through careless husbandry and lack of knowledge, these valuable timber areas are gradually being destroyed. In order to have a forest which shall year by year yield a regular supply of fuel or timber, the following measures should be adopted :

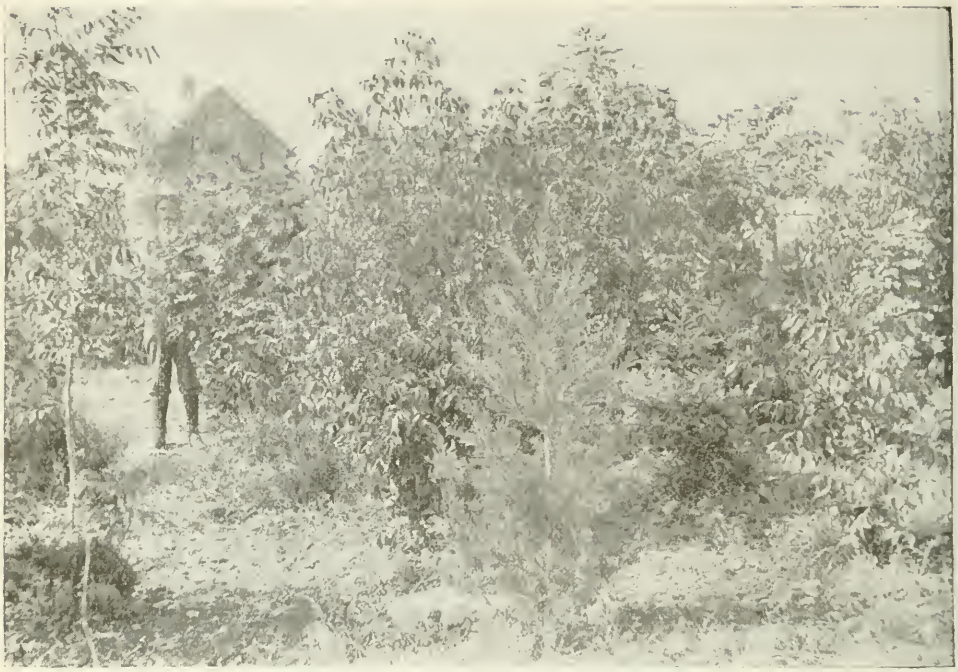
1st.—Keep cattle and other live stock out of the forest. The careless farmer, when pasture is scarce, during the summer months, allows his cows to wander at will through his woods. The result is that thousands of young seedlings, which must be preserved if the forest is to be perpetuated, are destroyed.

2nd.—Use the dead and fallen trees for fuel until the supply is exhausted.

3rd.—When cutting trees for cordwood or timber, select the partly dead, the largest and the oldest. Each of these when removed will permit light to reach several smaller trees which have been hitherto overshadowed.

4th —When felling trees exercise the greatest care to prevent others from being crushed.

5th.—Never let the cuttings be so severe that the openings made in the leafy covering overhead will not be closed by the growth of the trees remaining within three or four years. The reason for this is, that trees require a very large amount of water to make satisfactory growth, and unless there is a leafy covering overhead, the best conditions for preserving moisture will not be maintained, as the sun's rays striking the soil will hasten evaporation ; the wind will sweep in and help to dry up the ground ; the grass and weeds getting more light, will soon make vigorous growth and transpire large quantities of water ; sod will be formed about the trees, and when the rain falls, it will not soak in as readily as in dense woods where the loose and decayed leaves allow it a ready entrance into the soil. The result is that the trees do not make the growth they should and the whole forest suffers.



View in Mixed Forest Belt at Central Experimental Farm, Ottawa, May, 1897, showing growth of trees planted in autumn of 1894.

Let every farmer use forethought and judgment in all matters connected with his woods. It will well repay him, and his forest will be an heirloom to his descendants, of ever increasing value.

How to Grow a New Forest on the Farm.

Where the farmer has not the good fortune to possess a few acres of woodland, he should lose no time in planting a suitable area with the best kinds of trees. In a few years he will have a fine young forest and may live to see it yielding timber and fuel of good quality.

Where to Plant. Although trees will grow and do well on soil where grain or roots fail to yield good crops, they thrive best on good, well drained soil. Farmers who have poor land, where paying crops cannot be grown, or steep hillsides where the cultivation of the soil is difficult, can take advantage of the fact that trees will do well there and plant them on these areas. Should there be no poor land or no hillsides on the farm, it would be the best plan for them to plant the trees in belts along the northern and western boundaries of the farm, if this be possible, and they would then serve the purpose of a windbreak as well as their main one as a timber belt.

Preparation for Planting the Forest. Before young trees are planted in their permanent positions in the new forest, they should be grown in nursery rows for one or two years. This will enable them to get well rooted, and they will make better growth afterwards in consequence. The nursery rows should be about two and a half feet apart or less if land is valuable, and the young trees about nine inches apart in the row. The surface soil between the rows should be kept thoroughly cultivated during the growing season, and the soil between the rows kept loose with the hoe. Seedlings taken from the woods with little root growth are especially benefitted by this treatment and should be kept at least two years in the nursery. While the young trees are growing in the

View in Forest Belt at Central Experimental Farm, Ottawa, July, 1897, showing White Pine planted in spring of 1889, when eight to ten inches high, five by five feet apart.

nursery, the soil in which they are to spend the remainder of their life must be prepared for them. This should be done by deep ploughing and thorough cultivation, where possible, and the ploughing under of a good dressing of barn-yard manure and a red clover crop. This will enable the trees to make rapid growth at the start, and hasten the time when they shall need no cultivation. It will also lessen the expense of growing them and bring a quicker profit to the farmer.

When to Plant. The best time to plant trees is undoubtedly in the spring, before growth has begun and as soon as the soil is dry enough to work. By planting at that season they will be rooted before winter and will not suffer from heaving, which they often do when planted in the fall. As spring is the farmer's busiest season, if the trees could not be planted then they might be planted in the autumn, after the leaves have fallen, up to the time the ground freezes. It would be far better for the farmer to plant in the fall than to do it too late in the spring,

Method of Planting. To get the best results the trees should be planted well, to begin with. In the far west, where trees are planted by the thousands, there is not time to take much care in planting, but it will well repay the Ontario farmer to take more time and do the work well. If the tree is planted too deep, it will die; if it is not planted deep enough, it will also die. When the land is ready and the proper time for planting arrives, the places where the trees are to go should be marked and the holes dug. The rows should be straight and the trees at equal distances apart, so that the soil may be cultivated both ways. If the land be level a marker should be run through the field, marking where the rows are to go. It should then be run across the field, at right angles to the first marks, and the intersecting points will be where the trees are to be planted. A garden line or piece of binding twine, marked off into three, four, or five-foot spaces, might also be used for this purpose. However the work is done, the straighter the rows the easier the trees will be kept cultivated. Holes should be dug for the trees

View in Forest Belt at Central Experimental Farm, Ottawa, July, 1897, showing Black Walnut planted in spring of 1889, five by five feet apart, when two years old. The necessity of having a denser foliaged tree mixed with Black Walnut is very apparent as there is a thick sod under these trees.

a little larger than will contain the roots without cramping them. The roots of the young trees should not be allowed to become dry from the time they are taken from the nursery until they are planted in their permanent positions. Hundreds of expensive trees die annually throughout Ontario from careless planting, and one of the principal causes of death is that the roots are allowed to become dry. If the young trees are kept with their roots in a mixture of clay and water before they are planted, the results will well compensate for the trouble. Trees from one and a half to two feet high are the best size to plant. The larger a tree, the more it is affected by transplanting, and the poorer forest tree it will make. Small trees make vigorous growth and are much the best kind to plant. The trees should be planted a little deeper than where they have been growing in the nursery or in the forest—that is, the crown or junction between stem and root should be a little below the surface of the soil. The soil should be pressed firmly about the tree with the foot, which will prevent it from drying out as readily as it otherwise would.

Distance Apart to Plant and Cultivation.—The trees should be planted from three to five feet apart each way ; the closer they are planted the less labor there will be in cultivating and weeding ; the trees will be more protected, the best soil conditions for tree growth will be got sooner, as a leafy covering will soon be formed ; moisture will be retained better and the soil will not bake ; the lower branches will die quicker, thus making timber freer from knots ; and the upper growth of the trees will be greater, as it is height, rather than extent of branches, which is required. Wider planting has nothing to recommend it and will prove by far the most expensive and unsatisfactory method in the long run. During the growing season each year, and until the trees meet and require no further cultivation, the surface soil must be kept constantly stirred with the cultivator, as for a root crop. If the work be thoroughly done each year, after two or three seasons' growth those planted three feet apart should need no further cultivation.

View of Mixed Forest Belt at Central Experimental Farm, Ottawa, July, 1897, showing growth of trees planted in spring of 1893.

Kinds of Trees to Plant.—By planting trees as close as three feet apart each way, i would require 4,840 to plant one acre ; by planting five feet apart each way, it would require 1,742 trees. Were a farmer to buy all his trees from a nurseryman, the expense might be more than he would like to incur ; but many farmers are so situated that they could adopt a much cheaper plan. There is nothing to prevent the average farmer from raising thousands of young trees from seed of such kinds as black walnut, hickory, black cherry, butternut, oak, black and white ash, beech, maple, basswood and elm. The seed should be planted thickly as soon as ripe, in beds or nursery rows, the smaller seeds from one-half to an inch deep, and the larger from two to three inches. The kernels of the nuts should not be allowed to become dry before they are planted, else they will not grow. After a season's growth the seedlings should be transplanted. In two years a farmer could have a fine supply of young trees. Another method he might adopt would be to get young seedlings from the woods and plant in nursery rows until they were large enough and sufficiently rooted to be planted in the new forest. As for pines, it would be best to procure well rooted, nursery-grown stock. If the best timber trees are scarce in the vicinity, a good plan would be to buy a few hundred trees from some nurseryman and fill up with trees that can be obtained readily at home. The most valuable trees, when planted, should be placed at such distances apart that when thinning is begun, none of them will have to be cut down. The white pine and black walnut, especially, should be planted with this object in view. All the trees in the prospective forest should be planted with judgment and forethought. Plant to get a dense, leafy covering as soon as possible, and plant so that one tree will not be smothered by another in the early years of its growth. These results can be obtained by mixing judiciously the leafy, not very leafy, quick growing, slow growing, shade enduring, and light-needing kinds of trees. But, above all, plant the trees close ; they may be thinned at any time ; labour will be saved and better results follow.

View of Mixed Forest Belt at Central Experimental Farm, Ottawa, July, 1897, showing growth of tre planted in spring of 1888.

RESULTS OF FOREST TREE PLANTING AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA

Planting was begun in the forest belts, which extend along the northern and western bounderies of the farm, in the year 1888, and continued at intervals until 1894, when the work was completed. The belts are now nearly 1¾ miles long and contain about 20,000 trees. On the western boundary the belt is 165 feet wide, and on the northern boundary 65 feet wide. The trees have been planted both in groups of a single kind of tree and mixed as in a forest, the trees being planted, 5x5 feet, 5x10 feet and 10x10 feet apart. In some places, where the trees were planted 10 feet apart, they still require cultivation, though growing in the belt for eight years, while in that part of the belt composed of mixed trees, planted 5x5 feet apart four years ago, cultivation is no longer necessary, as the leaves of the trees now make so dense a shade that weeds and grass do not make much growth; the soil also does not bake, and moisture is preserved. Most of the best timber trees of America and Europe have been planted and very instructive and interesting facts regarding their growth have been obtained. The following are a few examples of what growth the trees have made in eight or nine years:

White Pine.—Planted in 1889, 5x5 feet apart, when 8 to 10 inches high, are now 13 feet in height and 11 inches in circumference one foot from the ground.

Scotch Pine.—Planted in 1888, 5x5 feet apart, when 18 inches high, are now 18 feet in height and 12 inches in circumference one foot from the ground.

Norway Spruce.—Planted in 1889, 5x5 feet apart, when 18 inches high, are now 13 feet in height and 10 inches in circumference one foot from the ground. These would have made more growth but the soil is very poor where they are growing.

Black Walnut.—Planted in 1889, 5x5 feet apart, when two years old, are now 14½ feet in height and 9½ inches in circumference one foot from the ground.

White Ash.—Planted in 1889, 5x5 feet apart, when three years old, are now 21 feet in height and 8½ inches in circumference one foot from the ground.

European Larch.—Planted in 1888, 5x5 feet apart, when two feet high, are now 21 feet in height and 13 inches in circumference one foot from the ground.

The above results show how quickly a farmer who desires to grow a new forest on his farm may have trees of considerable height and diameter in a comparitively short time.

Forest Trees as Windbreaks on the Farm.

Should the Ontario farmer not feel disposed yet to begin tree planting for purposes of timber and fuel, he should at least plant some trees for protection from prevailing wind. The advantages of a well grown evergreen windbreak must be so apparent to every thinking man that it seems marvellous that so few farmers plant trees with this object in view. The house, the stock, the orchard and garden, all need trees to break the force of the biting winds of winter and the hot and drying winds of spring and summer. The benefits derived from such a shelter, especially for the orchard, will well repay the farmer who takes the trouble to plant his trees. Some of the advantages of having a windbreak for the orchard are :—The fruit trees are protected from the severity of storms and escape unharmed ; the flower buds are not injured so much and the flowers not destroyed before their mission is performed ; and in the autumn, when the trees are loaded with fruit, the percentage of windfalls is very much lessened.

Planting a Windbreak. The windbreak should be planted on the north and west sides of what is to be protected. For an orchard, it should be forty feet distant from the outside row of fruit trees. The trees should be planted about twelve feet apart, in two rows, the rows being also twelve feet apart. The trees of the row nearest the object protected should be planted opposite the spaces between the trees of the row behind. One of the best trees to plant is the Norway spruce, as it grows rapidly and will soon afford protection. Young trees of the native white spruce also, which can often be obtained from neighbouring woods without cost, although slow in growing, soon make an effective and satisfactory windbreak. They should not be more than two feet in height when planted, and branching near to the ground. Pines might also be used, as they grow quickly and would be valuable for timber purposes in after years. The chief points in the raising of a good windbreak are : To plant the trees when they are small ; to plant trees with living branches near to the ground ; and to keep the surface soil loose about the young trees during the growing season.

PLANTING AND CARE OF SHADE TREES AND WINDBREAKS.

By Alfred Brown, Picton.

Farmers generally do not take advantage of the very easy and sure way of adding value to their real estate by planting our native trees in neat lines along road sides and lanes, around buildings and yards, in clumps on waste or unsightly places, or bluffs that are too rough for cultivation. These places, planted with black walnut, I believe, will be as good an investment as the same area of apple orchard on suitable soil, although dividends will not be realized from the walnut timber as early as from the apples. American black walnut can be grown better by planting the nuts directly where the trees are wanted, as the walnut is a little difficult to transplant owing to the large tap root and the absence of fibrous roots. This condition applies to most of the nut-bearing trees. The walnut begins to bear at Picton when planted from the nursery in about eight to ten years, and although the nuts are quite strong flavored they are relished by some people. For planting, the nuts should be gathered when ripe and not allowed to dry. They can be kept out doors by packing in a box of sand, or may be planted directly where desired. Cover the nuts three inches deep, mulching lightly ; keep down grass and weeds and use plenty of manure. When once started the trees increase in diameter about half an inch

every year. American sweet chestnut is grown for commercial purposes mostly in its natural state, but when planted in the clearance makes a good shade tree. The leaves are nicely serrated and glossy, giving the tree a beautiful appearance.

Hickory nuts have grown quite popular in the markets, and in selecting for planting, only use from trees bearing good sized, plump, meated nuts. These and the chestnut require the same treatment as mentioned for the walnut. Basswood, when planted in the clearance, forms a pretty, compact-shaped head, and besides being valuable as a timber, shade, and ornamental tree, it is a source of the best crop of honey produced by any plant grown in Canada, and as our forests are being destroyed it would be wise to have the basswood planted extensively for the encouragement of apiculture, for bees are valuable to fruit growers and farmers, as they insure fertilization of flowers. Basswood grows readily from seeds.

Sugar, or hard maple, our national emblem, should be planted broadcast everywhere where there is room for a tree, as it may be had in most localities for digging. It grows a symmetrical shaped head when properly planted and pruned. The soft maple grows very rapidly, and will succeed on a greater variety of soils than the hard maple. Trees in our yard planted eight years are six inches in diameter and give plenty of shade for the hammock. Maples can be dug best with a strong sharp spade, cutting a circle around the tree tweney-five to thirty inches in diameter and lifting out the plant with what soil and leaves adhere to it. Cut off all branches and saw off the top not more than seven feet from the roots. The trees that have given us the best growth were one and a half to two inches in diameter a foot from the ground when planted. When growth starts rub off all buds except a few at the top of the bare trunk to form a head.

Norway spruce is the best evergreen for practical use in Ontario, either as a wind-break or as an ornamental tree. It makes a dense upright growth of uniform shape, and is very attractive planted alone or alternately with deciduous varieties. Keep trees well mulched, which comes nearest to their natural condition. The writer does not favor planting trees thicker than they are to remain, except where straight long trunks are required for timber, for it requires more courage than most men have to thin out a row of trees when once they are established. The farmers at the Institute meeting at Glen Allan, estimated that a farm having 100 shade trees well arranged would sell for $500 more than a similar farm alongside, other improvements being the same. When young trees can be found not more than a mile from the place where needed, the 100 trees can be selected, dug, trimmed, and planted for $5 if the work had to be hired, but most farmers are strong-handed enough to plant 100 trees every spring.

Possible injuries.—(1) Where planted too thickly so as to form a wind stop, which is not desirable. A free circulation of air might be prevented and thus encourage insects and fungus growth. (2) Encroachment, adjacent crops will certainly be injured, but a good windbreak or line of ornamental trees are well worth the land they occupy.

Decided advantages.—Evaporation is lessened and the moisture in the soil assimilated by growing crops instead of being hurried in the air by heavy winds. For illustration of this point, refer to Prof Panton's experiment in the Report of the Superintendent of Farmers' Institutes for 1895-6, page 60, which shows that wind hastens the moisture out of the soil. (2) Protection of bloom from cold, rough weather will ensure a good crop which might from exposure result in a light yield. (3) Snow and leaves are retained and help to retard fruit bloom in localities subject to late spring frosts. (4) Less injury is sustained from wind when trees are loaded with ice which ruins so many fruit trees; also the loss from windfalls is reduced. (5) Erect growth in fruit trees is difficult without protection from prevailing winds. (6) Encouragement of insectivorous birds. This advantage alone is worth the land and care required to have a good wind-break where the birds will build their nests and rear their young largely on insects that destroy our crops. These birds and their nests should be protected by legislation, including the extermination of the English sparrows, which are driving useful and friendly birds out of the country by destroying their eggs and taking possession of the nests for their own use. (7) A farm beautified by shade trees is enjoyed both by the travelling public and by the farmers themselves.

FORESTRY IN RELATION TO THE FARM AND CROP.

By John Le Boutilier, Glen Millar.

In spite of all that has been said and written regarding the excessive clearing of our country, and the benefits resulting from having a just portion of our land wooded, the work of destruction still goes on, leaving many of our farms unsheltered and with scarcely a tree left either for use or ornament. From concession to concession in many places we have an unobstructed view, and the cold of winter is intensified by the keen piercing winds that sweep across the plains, banking the snow into unpassable drifts, and robbing the land of its fertility by the removal of the surface soil. Our streams in many districts have so diminished in volume that grist mills have had to cease grinding for want of water. May not also the lack of rain and moisture, which have been so disastrous of late years to our crops, be traced to the same cause? We are told that "Evil is often wrought for want of thought." Let us hope that in the present instance such may have been the case, and that in the future something practical may be done to preserve from destruction what is still left. Let us treat our wood-lots as we should our young orchards, from which cattle and sheep should be rigidly excluded, with barbless fence wire (and cross wires for sheep) stretched from tree to tree. It is comparatively easy and cheap to fence a block which is still mulched by the forest leaf. Into this lot so fenced other varieties may be planted, especially the nut-bearing trees, and others of use in manufacture. Then let us use judgment in cutting. Let the aged and decaying trees give place to the young growth. From the stumps of these old trees, if there are no cattle to destroy them, will often spring up sprouts to replace the old trees. Many of our forest trees may be propagated by cuttings. Among these are the basswood, of value in so many ways; the poplar, and the Russian mulberry. The black walnut and the American sweet chestnut, with which I am now experimenting, may in time be included in the list of native forest trees if planted. There is a constant and increasing demand for wood used in manufacturing, and the supply is decreasing. For the manufacture of cheese boxes, apple barrels and carriages, there will always be a demand which we could supply if our wood-lots were valued and cared for as they should be; and then how important the shelter afforded, especially to the north and west. How often do wood belts save a crop of wheat or clover! How pleasant in the winter time is the transition from a bleak exposed roadway to one bounded by a belt of wood land! A few years ago the Manitoba maple was unknown in this part of the Province, but to-day the streets of Belleville are adorned with the mature trees loaded with seeds and inviting you as you drive along to gather and sow them in your wood-lots. These trees, I understand, were grown from seed. But the proper place for trees is not along our cultivated fields, for their shade is often pernicious to vegetable growth, but in the wood-lot, on the lawn, around our springs, adorning our church and cemetery grounds, around our milk stands, and in the milking yard, are the proper places for trees, and the evergreen sheltering our orchards to the north and west. Our Government is wisely legislating in behalf of the forest. We have now an Arbor Day, but tree-planting on that day should not be circumscribed by the school lot; all should observe it, and along our road sides and wherever a tree might prove useful or beautiful, let the good work be done. Object lessons and charts in relation to trees, their uses and propagation, should find a place on our school house walls. Our river banks and other public property should be left wooded and carefully preserved. How often has the presence of trees in the scenery of a country fired the poetic imagination, as in the lines

"How dear to my heart are the scenes of my childhood
When fond recollection recalls them to view.
The orchard, the meadow, the deep-tangled wildwood,
And all the loved spots that my infancy knew.'

and the destruction of the same called forth a protest in poetic language :—

"Oh woodman, spare that tree,
Touch not a single bough
In youth it sheltered me,
So I'll protect it now."

Let us, therefore, value and spare the wood land, not only for its utility, but also for its beauty and the intimate relation it bears to our farms and crops.

WINDBREAKS ON THE FARM.

By D. Dempsey, Stratford.

In dealing with this subject let us convey our thoughts back to the time when Ontario was first settled, in order that we might compare it with the same fair Province of to-day. We took possession of our Province in its forest state, when it was a rich and fertile land. We grew crops of grain that were the envy of the world. Can we do that now? For many years back we have not been able to raise anything like the quantity of grain and the samples are alike inferior. For years we have been far below the English average. This is partly due to the fact that we do not use as much manure as they do, but more directly to the fact that we have dried up our land by over-clearing, and for want of under-draining have allowed the flow of water over the surface to wash away much of the rich soil into the watercourses. We find that exactly the same course was pursued in the Eastern States with exactly the same results. Now, let us examine the manner in which this comes to pass, and notice the influence of the climate on our soil in regard to its fruitfulness or sterility. No one seems to have stopped to inquire into the relations which (particularly in such a climate) the trees of the forest bore to the operation of the farmer, as affecting the rain or snowfall or protecting the crops, or serving any other purpose than to supply rails or cordwood. Let me now, in a few words, give my reasons for believing that our land has been injured by over-clearing. In the first place, we know that all plants and trees derive what food the earth gives them through openings in their rootlets called spongioles. But nourishment close to these soon becomes exhausted. How does the plant receive the food which lies a little way from it? It is by means of the great carrier of plant food, water in motion. There are two movements of water through the soil which chiefly affect this. Namely, that of gravity, by which it is attracted downwards, and that of capillarity, which draws it up to the surface and into the air. Those two upward and downward movements of the water carry the plant food within reach of the attractive influence which the roots possess. When a shower falls in summer time, all can see the effect, largely owing to the passage of water through the soil, both in separating and preparing the particles of plant food in the earth for nourishment to the growing plants and carrying them within reach of its roots. It is now to be noticed that where fields possess the shelter given by woods or wind breaks that this valuable process will last much longer. For this reason the moisture in the land will remain and dry out slowly, while in an open country it would not last one quarter the time. A sheltered field is dried by a slow upward movement of vapor; an unsheltered one is dried by a rapid half circular movement of successive waves of air, a natural drying machine in fact. Now, from the above we will see the reason so far as at present understood why a better growth may be expected, other things being equal, where sheltered by woods or rows of trees.

Meantime men have toiled early and late to shelter themselves and their families and their stock in comfortable buildings, and, to provide the necessaries of life, have deprived the very staff of life of its natural and necessary shelter. Time and again they have have seen the crop on which depended so much of their prosperity perish before their very eyes. We may improve on our plows and harrows; we may experiment with

manures and fertilizers; we may be more rapid and correct than our grandfathers in our methods of sowing and reaping, but the amount of return obtained in comparison with the labor bestowed to obtain it does not increase We are brought face to face with the fact that in most parts of the country, with all our modern appliances and all our scientific farming, the average number of bushels raised per acre is by no means what in former days was frequently obtained. It was for a number of years common to believe that the comparative deficiency was owing to overcropping the land, and nothing was more common than to hear opinions given that throughout Ontario farmers were running their land to death. But one remarkable fact was observed which completely confuted the idea that the lesser fertility was altogether due to that cause. Where a piece of land had been left till lately in forest, and then cleared and put in crop, it has invariably failed to produce as good a crop as the acres alongside of it did in the early days. How is this? The land should be just as rich; it was timbered with beech and maple the same as many a field that lay beside it; it certainly had not been overcropped for it never had been cropped. The question was very naturally asked, why had this land on which grain crops had never been grown diminished in fertility? The answer is not hard to find. When the result of the clearing of the forest has been examined, as it has been of late years by many scientific men, it has been found that in parts of our continent, where fertility has decreased, too much of our forests had been cut away; and that it is certainly known that many countries of the old world have by carelessly cutting down their forests changed their good soil into barren land; so in the new world the same process has been energetically begun and the symptoms of decreasing fertility has appeared precisely concurrent with its progress. Small blame, it is true, attaches to the pioneer in a wooded country if he does cut and slash all obstructions somewhat ruthlessly. The early settlers of Canada often found themselves in circumstances almost desperate. They had neither roads nor markets for timber if they preserved it, and surrounded by what seemed to them an illimitable extent of forest they naturally took small account of what might be the state of things in the days of their grandchildren or future generations. But it is surprising to see even now, with the bare facts staring us in the face, that our farmers, who are to-day practically owners of the remaining timbered lands of our Province in all the settled districts, are in a condition of profound lethargy or innocent unconsciousness of the dangers they invite or the losses they incur. Still there is time enough even yet on many farms in this part of our Province for waste to be prevented, danger averted and money saved, if men will only wake up and shake off the apathy they have hitherto exhibited, and see the true state of affairs in the light of self interest, not to say of self preservation. It is not my purpose to introduce here any lurid pictures of the calamities in store for us, as better pens than mine, guided by the hands of science, have already enlightened us as to the probable result if present conditions are allowed to continue. Ours is not the only country in the world that has had to face the situation in this respect. It is now full time that the people of every country and every township and every Farmers' Institute took counsel as to the best means of keeping and improving our forest protection. As far as retaining forests goes there is but one way and that is, never let the cattle into it. If they must have forest shelter by all means let them have it, but let a portion be fenced off from that which it is wished to preserve in good forest condition. If a piece of bush, while it is yet possessed of its original thick bed of forest leaves and decaying twigs, be fenced off against cattle it will protect itself in a great part, for the young trees growing around the edges, being habituated in their early days to sun, will grow up hardy with deep roots. These will not blow down and they will prevent the drying winds blowing through the rest and injuring it. Young saplings will continue to take root and spring up, then, by carefully cutting out old trees as soon as they are ready and a little thinning where the underbrush is too rank, a portion of the forest may be preserved which will always yield a succession of timber valuable for many purposes and a continual shelter to the adjacent farm lands.

It has been common to say, we will keep this piece of bush and underbrush it and it will be a nice pasture for the cattle. We might as well try to encourage the growth of a nation by killing off the children. The small trees keep the large ones in health, and obeying

the great laws of the survival of the fittest, the weakest die and the strongest grow to full sized trees. But it will be observed that in a great many cases the bush that is left on a farm is situated on one corner of the back end of the farm, and no matter how we improve it, it will only make a partial windbreak for the whole farm. Now we can easily remedy this by laying off a belt all along the back or wherever we wish, and, after putting it in good order, either plant trees or sow the seeds in it. It would be best to either sow or plant in close nursery rows so that it could be cultivated with a horse for a few years till they get well started. By adding a selection of valuable varieties, such as ash, hickory walnut, etc., we would soon have not only a valuable windbreak but a variety of timber that would be worth ten times more than all the value of the land for other purposes.

A word in regard to windbreaks in such situations that timber belts would not be practicable, such as protection for orchards, fields, or buildings. I would certainly prefe the evergreens for this purpose, such as Norway spruce, Scotch or Austrian pine. A mistaken idea seems to prevail in regard to what constitutes a proper windbreak. In the majority of cases, where efforts have been made to have a windbreak, the aim seems to have been to shut out the wind altogether. Now this may do well enough in sheltering our buildings, but it is very dangerous for our orchards or other crops, in the first place, by collecting the snow in winter to such depths as to crush and smother everything beneath it; and, secondly, the spring and summer frosts always do more harm where there is a dead calm.

We must remember that wind and water are necessary in agriculture, but like most other natural agencies they are most valuable when controlled and guided, and most destructive when allowed to gain pre-eminence. We don't want to shut out the wind altogether; we only want to break its force or hold it in check as we would a fiery steed, and keep it down to the work that nature intended it to do. As to the proper distance for planting trees for windbreaks, we will have to be guided by circumstances. If for an orchard in such a position that we will have to plant close to it, we would require to plant our trees closer together than if we could get our windbreak farther away. The reason for this is that when the wind strikes the trees if they are some distance apart its course will be checked but it will rush through the opening between the trees with more or less force. The vacuum caused by the tree draws the wind again out of its course and creates a kind of circular motion, thus breaking the force of the wind and still allowing it to pass through quietly. If we plant trees far apart, the wind passing between them being in a larger body will rush on further before turning into the vacuum, than if they were closer together. So that in planting we must be guided by the distance we can get our windbreak from what we wish to protect. In case of the protection of large fields, I would not put trees closer than 15 feet apart—that is spruce or pine. This may appear a long distance apart for a windbreak, but if trees are properly cared for and kept growing they will soon grow together at that distance and will require some trimming to regulate the air currents. In fact Norway spruce at that distance, if well formed, will be close enough together as soon as they are high enough to be of use for a windbreak.

A word to those who intend planting windbreaks. I would say emphatically, don't plant a tree until you are pefectly satisfied that your ground is in proper order to receive it. I have seen many failures where people have planted on land not properly prepared. If trees are planted where the grass and weeds are allowed to grow up around them, they are sure to prove a failure. A tree can be made to grow as much in one year, if properly taken care of, as it would in five years if allowed to take care of itself. If you make up your mind to take care of them and get them well started, you will get interested in them and it will be one of the pleasures of your life to watch them grow up. In regard to planting on roadsides, the time has arrived when our roads are no longer used for pasturing stock; at least I know that most of the townships around us have prohibited live stock of all kinds from pasturing on the roadsides. If this law is carried out properly, we cannot get a better place to plant windbreaks than along our roads. Our road allowance of 66 feet is wider than is really necessary. That part between the water table and fence is never used for travel. Why could this part not be graded and cultivated by the farmer,

owning the land alongside, the same as the boulevards in towns and cities Trees could be planted say five or six feet from the line or fence, so that cattle could not reach them from the fields inside, and they could be taken care of and the ground cultivated on both sides till they are large enough to take care of themselves. I think that this is a scheme which should be brought to the notice of our township and county councils ; some uniform plan should be adopted and even some assistance given in the way of providing trees free or getting them in large lots at wholesale rates, and in passing laws to protect trees planted on roadsides ; or perhaps in giving premiums for well kept rows of trees What an improvement it would make in the appearance of the whole country if such a scheme was carried out successfully, and the cost would be next to nothing to the farmers. They might grow root crops for a few years. Some might say that evergreens planted in that way would be an injury to the roads by holding the snow in winter. That danger could be averted by dressing off a few of the under limbs and allowing enough air to pass through to carry the snow onward.

When I received an invitation a few weeks ago to prepare a paper on this subject, it began to dawn on me that although I had some experience in growing trees and planting windbreaks, I had not studied the subject in all its bearings, and when I got fairly to work preparing this paper the more I studied the facts from different standpoints the more I became convinced of the importance of the subject and of the urgent necessity of better shelter for our farms.

POULTRY DEPARTMENT.

A TALK WITH A FARMER AND SOME STATEMENTS WHICH HE MADE AND OTHERS HE ENDORSED.

By A. G. Gilbert, Central Experimental Farm, Ottawa.

"I saw spring chickens sold this morning, May 15th, 1897, at one dollar and a half per pair, at a certain place in this city," said a farmer to me about two weeks ago. "I saw new laid eggs sold in the same place last winter for fifty cents per dozen," said the same farmer at the same time. "I believe what you say," I replied, "but place and price were exceptional. The chickens were incubator hatched no doubt, and the eggs brought that price because they were larger and could be relied on as new laid." "What one man can do another can," said the farmer. "Doubtless," said I, "and I have been preaching the same to the farmers for years. But it would not do for me to hold out to the farmers such prices as you have quoted, without explaining the exceptional circumstanses. I am afraid they would hardly believe the figures." "Well, all the better if they don't," said the farmer. "The fewer there are at this business, the more money in it for them that can get the early chickens and winter eggs." "Very true," I remarked, "but rather a selfish view to take, is it not? How would it be if there were greater production? Prices might be lower, but would not more producers and consumers be benefitted?" And then we had a good old-fashioned talk, in which we thrashed the subject out pretty well, and in which, (among others), the following points were brought out. There are two classes of producers of market poultry and eggs, viz.: the specialist and the farmer. The first is expert. He has served, as it were, his apprenticeship to the business. He uses incubators and brooders to get his early chickens, so as to obtain the high prices of springtime. He uses his incubators and brooders as the market gardener does his hotbeds, in order to get his product when it is worth most. He manages his hens so that they lay in winter when eggs are worth most. The farmer uses hens to hatch out his chickens which are comparatively late, but which, if of a superior sort, ought to bring ten cents per lb. in the city from first-class dealers. Less, if sold in the country store or market. His hens, as a rule, do not lay until prices are on the decline. This man must evidently be contented with a smaller margin of profit than the specialist. There is nothing to prevent the farmer from becoming a specialist. Many farmers raise a superior quality of market poultry and have their hens laying in winter. If in the neighborhood of a city or large town they will get good paying prices; that farmers in the neighborhood of cities and towns have many opportunities, but do not always take advantake of them. If they produce a superior quality of poultry, eggs or print butter, they do not make effort enough to secure customers who are willing to pay a good price for a first-class article, and who are to be had in every city and large town. The price of eggs might be lowered in the cities in winter and there yet remain a handsome margin of profit to the farmer.

As to prices and cost of production, I managed to feed 204 hens last winter on two rations per diem, at a cost of 43 cents. Rations were as follows:—

Morning ration: 12 lbs. cut green bone @ 1½c. per lb	.18
Afternoon ration: 20 lbs. wheat or buckwheat, @ 1c	.20
Unmarketable vegetables, grit, etc	.05
	.43

All the hens were not layers, as some were old and kept for setters, and some were young pullets. We calculated 125 or 130 layers. From these we had :

1896.	Eggs.
November	568
December	1,466
1897.	
January	1,531
February	1,351
March	1,668
April	2,139

During November eggs sold at 25 cents per dozen.
" December " " 30 " and 35 "
" January " " 25 " "
" February " " 20 " "
" March " " 15 " "

Make your own calculation. In so doing, remember that we got as high prices as we could obtain, but no higher than a farmer in the locality could get by a little energy. One lot of eighteen dozen eggs went to Montreal in January and brought forty cents per dozen, less express charges. I make no calculation after March, because we then began to sell eggs for hatching and set them ourselves. The above is given to show what can be done by getting your product at the period of high prices. I have no space for more particulars, but careful experiment has resulted in estimating the cost of feeding a hen per year at seventy-five cents. Eggs per dozen in summer, when hens are running at large, should be produced at no more than four or five cents per dozen. Why ? Because we fed fifty hens during last winter on ten cents per diem, and if fifty hens running at large, will not lay two dozen eggs per day during summer, I am very much mistaken. The ten cent ration was composed of three and a half pounds cut bone, at one cent per pound, five pounds of grain at one cent, and one and a half cents for unmarketable vegetables, grit, etc. Running at large, with opportunity to supply themselves with green stuff, grit and insect life, fifty hens ought to be fed on five cents worth of grain per day, the way prices are at present. If eggs can be produced at five cents per dozen, they will pay well at eight cents for the same number. Of course I am talking of the summer season. I should state that on the ten cent per diem ration, during last winter, the fifty hens laid sometimes twenty-seven eggs, at others, twenty two eggs per day, and these we got thirty-five cents per dozen for in December, making about seventy cents at a cost of ten cents. I am at once met with the statement, "Oh ! a farmer would never get such figures." Well then, take half what I got.

POULTRY FOR PROFIT.

By W. R. Graham, Belleville.

When you ask the majority of farmers if poultry pays, you are told very emphatically "No." You may say that eggs in winter yield a handsome profit, but you will be told that they do not usually lay at that season of the year. Then, if we are going to make them pay we must endeavor to get eggs in winter. There are three chief reasons why hens do not lay in winter :—improper food, a poor house, and an unsuitable class of fowls. Why improper food ? The question is often asked, "What kind of grain is best for egg production ?" If hens are fed on grain alone they are almost sure to eat the largest share of the profits. In these days of keen competition we seek to produce a good wholesome article at the least possible expense. If eggs are to be produced in winter in large quantities we must imitate summer food. If you watch a hen feeding during a summer day you will observe that she eats a quantity of grass, insects, vegetable, and picks up bits of grit, such as gravel and old morter, in addition to her daily ration of grain. This is what you must feed her during the winter to get the best returns. Grass can be best replaced by clover hay, cut fine. You must feed either meat or ground bone to replace the insects, and vegetable—as mangles, carrots, turnips, and

cabbage as a substitute for grass. These foods are cheaper than grain and much more desirable. The method of feeding practised by the writer is equal parts, by measure, of clover hay, cooked vegetables, bran, ground oats, peas, and barley, all thoroughly mixed and *scalded* some hours before feeding, and fed warm at sunrise. This is fed in troughs and no more given than they will readily eat up clean. At noon a handful or so of barley is scattered in the litter to give the hens exercise. At about two o'clock give one pound of meat or cut green bone for every fifteen hens; after this is eaten give buckwheat or other grain well scattered in the litter. Before roosting time give in troughs all the whole grain, either wheat or buckwheat, they will eat, being very careful to remove all that may be left so that in the morning they are ready for their feed.

What is required in a good house? It should be dry, warm, and light; it should face the south or southeast, and should open into a barn-yard so that the hens may get out in the fresh air on sunny days. The front should have plenty of light but not too much, as too much glass makes a house cold at night. One third of the front is plenty of light. Every fowl should have at least four square feet of scratching floor. Plenty of exercise is necessary to promote warmth and health. The house should at least be warm enough not to freeze their combs; also, it should be clean and all manure should be removed once or twice a week.

Hens not through moulting by the middle of November, or hens over two years old or very late hatched immature pullets will not lay in winter, and are only a bill of expense, as are also all unnecessary male birds. To get the best result select the besy layers—those having strong, vigorous constitutions—and rear their off-spring, using a pure bred male. Never fail to have a plentiful supply of water and grit within east access.

THE POSSIBILITIES OF THE POULTRY INDUSTRY.

By J. E. Meyer, Kossuth.

I am glad to find that the farmers of the Province generally are beginning to pay more attention to their poultry. We certainly cannot afford at the present prices of farm products to keep anything that is not giving a profit where it is possible to make a profit, as it is with poultry. While every farmer keeps hens, they have not been kept and cared for with the same intelligence as the other live stock of the farm. It is for this reason, and for this reason only, that we hear farmers say so often, "Poultry does not pay!" If we are going to make our poultry pay we must feed the proper food, which does not mean an expensive diet. We must give them suitable shelter during winter; we must never in-breed but breed intelligently; and we must not look to hens over two years old or late fence corner hatched chickens for our winter eggs. While I believe that, everything taken into consideration, pure-bred fowls are the best to keep, yet I do not consider it necessary to have a pure-bred flock in order to have a profitable flock. Any flock of hens can be greatly improved by using pure-bred males and selecting your best layers each year from which to raise your chickens. To put a flock on a paying basis, kill off all old hens in the fall. They are generally quite easily picked out about December 1st, or earlier, as many of the oldest will not be thoroughly through moulting. Even if they are through the moult, they will be pale and old looking. Also get rid of all late hatched chickens, as they will eat many times more than they are worth during the winter. Early hatched, well grown pullets, then, and yearling hens are the only birds you should keep in your winter flock of fowls A flock of hens of this description is bound to prove profitable under proper management. They should be fed a variety of food, composed largely of vegetables,—not grain three times a day,—and be made to lay right through the winter, when a good price can be obtained for eggs. It costs less to feed hens on the proper food during winter than feeding them all the grain they will eat, as is so often done, and besides you have many times more eggs which will certainly pay you well for the extra little trouble you take.

Do not crowd your birds together. Six square feet of floor space should be allowed for each bird, and not more than fifty should be kept in one flock. Give them more room if you can and they will do better. I have, from actual experience, learned that a flock kept in small quarters on the best of food will not lay as many eggs, while eating twice as much, as a flock half the size in the same quarters. Another common mistake is breeding from the whole flock instead of choosing ten or twelve of the very best layers and breeding only from them. No live stock can be so rapidly improved when properly handled as poultry. By selecting only the best layers for breeders, and mating to suitable pure-bred males, the average egg production of whole flocks has in a very few years been raised from 150 to 250 per annum, and even as high as 300 has been reached by a few hens. When we remember that the average egg yield of the hens of this Province is considerably under 100, we can readily see that there is vast room for improvement. The first great step toward inprovement will be made when nothing but early hatched pullets and yearling hens are kept in our flocks. The next step will be proper housing and feeding. When we have taken these two steps forward we will, I feel certain, have increased the egg yield of our poultry nearly, if not quite, 100%. We can take these two steps without any extra cost beyond the very trifling one of increasing the comfort of our buildings in some cases. I am anxiously looking forward to the day when these improvements will be made on every farm in our Province. That will be the last day on which the remark "There is no money in hens" will be heard. The other improvements will not be so quickly but just as cheaply done. Select your best layers only for your breeders, year by year, and mate with them a pure-bred male of the best variety you can get, or if you are breeding a pure-bred variety do the selecting just the same. Every poultry house should have a pen set apart for a breeding pen into which put ten or twelve of your best females and your breeding male. Do not on any account allow a male to run with your general flock that are laying eggs for market or home consumption. Be sure that every egg you send to market is infertile. It is not very long since it was considered impossible to ship eggs from Canada and have them arrive in the British market fresh. Results have proved this untrue, and we find by the last returns made by the British Agricultural Department that Canada supplied Great Britain with about $750,000 worth of eggs during twelve months. This is a very encouraging outlook for us, especially since circumstances on every hand are forcing us to look to Great Britain as our market. With fast steamship service and cold storage, everything is favorable toward promoting extensive trade with Great Britain. We must do our part and there is no doubt that we will profit thereby. We must send nothing but the very best we can get in quality, size and appearance. I would especially emphasize the quality, and the most important thing necessary to obtain the quality is to see that every egg that reaches Great Britain is infertile. Great Britain spends annually nearly $15,000,000 for foreign eggs. Of this amount, France supplies one third or $5 000 000. The little country of Belgium, just look at the size of it on the map, sends $3,500,000 worth, and little Denmark over $2,000,000 worth. Just think of the amount of wealth these three countries derive each year from the work of the much abused little hen. Look what we are doing with our cheese in competition with these countries. Am I saying too much when I say that we can compete equally well with them in the egg trade? I trust not.

POULTRY KEEPING.

By W. G. Whitfield.

I will try and show how it is possible to get at least a small profit from keeping a few hens. First, we must have the right kind of hens to lay through the entire winter, to insure a profit at all. We have many excellent breeds, each with their good qualities. It is difficult to find any one breed a general purpose all round hen for the egg basket and table in the same bird. My own experience is that none quite fill the bill. We have tried many different kinds and are still experimenting, having a number of pure breeds and their crosses. I have had a long experience in both dairying and poultry keeping,

and have no hesitation in saying that twenty-five hens will give a larger profit than a cow; but here the comparison must stop, as here we meet the difficulty of providing quarters through our long winters, as a building that will house twenty five hens will hold from four to five cows with comfort. We can crowd twenty-five hens into a small place. Commence to crowd and away goes the profit. They must have room for exercise and plenty of it. Here comes the trouble with many fancy poultry keepers. They tell you their hens do not lay very well. If they do, the eggs do not hatch well, although the birds are given the best of care. The trouble is too close quarters, too much confinement. A building suitable for a cow byre would not quite suit as a hen house. To give a few hens suitable quarters need not be expensive, and still have all the necessaries for success. What is required is warmth, plenty of room and plenty of light, and that properly arranged. In my own hen house, I thought I had provided everything both for room and convenience. I have about 160 square feet of glass, and to-day, if I were building again, I do not think I would change, unless to add a little more glass. If the sash were double, it would be all the better—one-half in roof on the south side of the building; this would not only give light but heat. The dust should be placed under the glass roof and when the sun strikes it the hens will take their morning bath; we use road dust and ashes for this purpose. This will keep both the hens and the house free of all kinds of lice. Artificial heat is often needed. The house should be as dry and warm as possible, and there are days when a fire will pay well. Here I differ from Mr. Clark. He thinks artificial heat is not needed; but after twenty-three years' experience sometimes with it and sometimes without it, I think a stove one of the necessaries to keep the air warm and dry; we only use the stove to meet changes in the weather; without it the hens will not keep up their daily number of eggs. This is not a new thing. Well do I remember when a boy, now over fifty years ago, a family that kept their hens in the house day and night through the winter and they got eggs the whole winter through. About forty would roost on the sticks of the Dutch fireplace, and the mantel-piece would be packed from end to end. Those people always had eggs for Hamilton market when other farmers couldn't get an egg for Easter. To-day we do not like to resort to this plan, but we must have the same conditions, warm, dry quarters, not thinking anything too good; but, like the Irishman when he said, "Who has a better right to the best room in the house than the pig, for shure he pays the rent," and to-day the hen must have the best to pay a profit. Their food should be of the best to get the best quality of eggs, as the flavor of the egg will be affected by what the hen eats quite as much as milk by the food the cows eats, and here we want a variety, not all one kind of grain, but a little of all kinds, both whole and ground, hot and cold, with plenty of clean water before them all the time; something green once or twice a week. Fresh meat is another essential, and should be fed two or three times a week. The profits are the reward of the daily almost hourly attention to details just at the right time, such as feeding, watering, cleaning the house, gathering the eggs, etc. Finally, put the eggs on the market once a week at least.

POULTRY ON THE FARM.

By Mrs. Joseph Yuill, Carleton Place.

On the first day of January, 1896, I took charge of my hens and kept an account of the cost of feed for the year 1896. I also kept an account of returns.

2½	lbs. clover @ $8.00 per ton	01
5	" shorts @ $12 00 per ton	03
20	" mangels @ .10 per lb	03⅓
5	" ensilage @ $2.00 per ton	00½
5	" oats @ 20c. per lb	.03
	Meat scraps	.00-½
		.11-⅓

It cost eleven and one-third cents per day for feed. For their breakfast I take two and one-half pounds clover, put it into a pot with one half a gallon of water, set it on the stove, let it come to a boil, lift it off, and allow it to drain for an hour. I put 5 lbs. shorts into a large pail, empty the clover on the shorts and mix them so that they will be moist but not wet. At half past nine o'clock I feed them 20 lbs. mangels. The mangels should have a narrow strip of the peeling taken off the four sides to give the hens a start. Bore a hole through the end of the root with a sharp knife, hang the mangels from the ceiling with a wire high enough from the floor so that the hens can reach it. At noon I feed them 5 lbs. ensilage and all the clean pure water that they will take. In cold weather I warm the water. Hens should never be allowed to get into their feed or into their drink with their feet. In autumn when we kill our pigs and beef we boil the livers, lungs and other refuse parts in a large kettle, using a large quantity of water. When it is well boiled it is thickened with peas, oats, and barley ground fine. It is then put into small barrels and allowed to freeze solid. Then the barrels are rolled into the hen house and a few staves are broken out of one barrel at a time. The hens will work away at this all winter. I allow ½ a cent. a day for this. I lay in a good supply of fine sand and wood ashes. I find that lime which has been exposed for a year is better than old plaster. I have a small door in my hen house through which my hens pass in and out. I have a small muslin bag filled with sulphur hanging over the door on the inside of the hen house so that the hens will touch it with their heads every time they go out and in This sprinkles sulphur on the hens and keeps them free of vermin. Poultry should have a plentiful supply of fresh pure water every day. I believe want of water in the poultry house is the cause of more loss to farmers than anything else which effects their poultry. When a soft day comes the water drops from the roof into the manure. The hens being thirsty, drink this liquid manure which is sure to cause scours. We have bred Barred Plymouth Rocks for some years, but are giving the White Plymouth Rocks a trial; not that I consider them any better fowl, but on account of being white they are easier cleaned for market. We raise one hundred and fifty chickens every year. The chances are that one-half of them will be cockrels. As soon as they are large enough to kill, we commence killing them and supplying private customers at 50 cents per pair. When all the cockerels are killed, we commence killing off the old hens. We never keep a hen over the second winter, except a few and as mothers. I find the best way to stop hens clucking is to have a box three feet wide by about six feet long with a slat bottom round it so that the hen will have no place to sit down on except on a bar. Set the box say six inches from the ground to allow a current of fresh air to pass under. Give plenty of feed and water, and in three days she may be let out and will commence to lay. I raised 150 chickens until they were four months old at a cost of $4 97 3-10 cents. The first ten days I fed them on a scone made from ½ lb. oat meal, ½ lb. corn meal, 1 lb. shorts, one teaspoonful salt, one teaspoonful soda, damp with buttermilk, bake with steam till well done. When cold, crumble fine, add one hard boiled egg chopped fine to each day's ration. This scone will be sufficient to last 150 chickens for the first ten days. The next month I feed them 1 lb small wheat, and 1½ lbs. cracked peas each day. The next month I feed 2 lbs. boiled peas and 3 lbs, shorts mixed thoroughly. The next month feed the same ingredients, but double the amount. For the last three weeks feed the same, but again double the amount. The first ten days they cost 18 cents. The next month they cost 48¾ cents, and the next month they cost 97½ cents. The third month $1 95 and the last three weeks, $1.48, making a total of $4 97 3-10. I have small troughs constructed so that chickens cannot get into them with their feet. I keep them supplied with water and milk. We keep 50 of the best pullets for laying hens; but for convenience we will suppose that we will kill them all. We sold them at 50 cents per pair making $37.50, feathers $3 00, making $40.50, and 639 dozen eggs at an average of 13¾ cents per dozen, $87.86¼; total earning, $128.36¼; cost of feeding hens, $33.90½, cost of feeding chickens, $4.97 3-10—$38.87 4-5; profit on hens, $89.48 9-20; profit on each hen, $1.69.

GOOD ROADS DEPARTMENT.

ROAD MAKING.

By A. W. Campbell, Good Roads Commissioner, Toronto.

The majority of roads as constructed are too flat to shed the water. The sides of the grade form square shoulders which obstruct the water from passing to the side drains. Drains of sufficient size are frequently made but no outlets provided; where this occurs they simply form receptacles for water which then soaks into the roadway and causes it to yield readily to the wheels. Proper outlets should be made for all drains, and these outlets should be obtained as frequently as possible. It is advisable to dispose of the water quickly after it falls and in small quantities; for this purpose all natural water courses should be used. Deep open ditches provide good drainage but are dangerous, unsightly, and expensive to maintain; shallow gutters with uniform fall are preferable. Where deep drainage is necessary tile drains built under these gutters sunk below the frost line and provided with a proper out fall is more serviceable. When the ground becomes saturated the frost penetrates a depth of from two to four feet causing considerable expansion, and when leaving creates voids which weakens the structure. Tile drains are constantly at work preventing largely this saturation and removing the destructive action of the water and frost.

Crown.—Roads should be crowned so as to shed the water from the centre to the side-drains, otherwise water will stand on the surface, soak into it, soften, and cause rapid wear and decay; but a crown higher than is necessary to properly drain the surface is also objectionable. A gravel road should be given a crown of about an inch of rise to each foot in width of grade from centre to the side. This is sufficient to properly shed the water if the surface is made hard and smooth. If a greater crown is given, the tendency is to concentrate the traffic on the centre and cause greater wear; again, an excessive crown causes the load in turning out to be thrown on two wheels in such a way as to cut the sides of the road. The form of the crown should be as near circular as possible.

Gravel.—Where gravel of a good quality can be procured within easy hauling distance, it is undoubtedly a valuable material for country roads and residental streets. Where such gravel cannot be obtained within easy hauling distance, it will be well to consider the use of other material. If gravel has to be hauled a considerable distance it frequently does not prove the most economical; the first cost may be the lower, but the final cost greater than a higher priced stone. Many municipalities are teaming poor gravel from five to ten miles; a first class metal could be supplied by rail at a little advance in first cost but much less expensive to maintain. Gravel has not very satisfactory qualities, especially when it contains a large amount of sand and earthy matter. Where much sand and earth are contained it should be removed by screening and the large stones broken. Foreign matter assists consolidation, and under traffic the mass quickly becomes smooth and hard. This remains during dry weather, but it readily attracts the moisture and permits the rain to pass down through the mass weakening the bond and causing the metal to yield to wheels and create slush, mud, and ruts. Ruts form receptacles for water, the destroyer of roads. Gravel found in streams is usually of the best quality, as it can be washed by natural drainage. Lake gravel varies greatly; although usually of a good quality the stones are much water worn and difficult to consolidate by traffic, but contain enough clean sand to properly bond under a heavy roller.

Broken stone.—A good quality of broken stone is a much more durable material than gravel. The best stone is that which is tough, hard, and which will not readily decay by the action of the atmosphere. Field stone, stream and pit boulders are to be found in abundance in a great many sections of the Province. Generally this stone is of a good quality but

often contains a large percentage of "weathered" sandstone and granites. Care should be taken to exclude these boulders which are soft or weathered. Stone broken into cubical fragments will take on a mechanical grasp and a perfect bond formed by rolling without the assistance of a foreign matter. This cannot be affected to the same degree with gravel or round pebbles. The stone should be broken into sizes varying from one inch to two and one-half inches. The largest stone should be placed in the bottom of the roadbed and the smallest on top; this should be done in layers, the thickness of which should vary in proportion to the strength of roadway required. Each layer should be thoroughly rolled before the next is applied. A coating of the fine screenings produced from the crusher by screening should be placed on the surface of each layer to fill the voids. A watering cart should precede the roller. By keeping the surface moist, consolidation will be more readily and perfectly effected.

Width of roadways.—Main or much travelled roads should be made twenty-four feet wide between the gutters. Roads leading into these and accommodating neighborhoods or sections, and the next in importance should be twenty feet, and cross roads or concession roads but little used should be eighteen feet. The metalled portion of the road should be from seven to ten feet in width, according to the importance of the road. The depth of the gravel or stone must vary with the quality of the material, the amount and nature of traffic on the road, and the nature of the sub soil. A dry, stoney, and compact sub soil will need less metal than would a plastic clay difficult to drain. From six to ten inches of metal well consolidated will afford a sufficient range to accommodate most circumstances.

Rolling.—Heavy rollers have been but little used in this country. Municipal officials are fast becoming convinced of their usefulness, and within the past couple of years several have been purchased in the Province, and in every instance they are greatly appreciated. London, Stratford, Galt, St. Catharines, Brockville, Kingston, Ottawa, Toronto, and Niagara Falls are using steam rollers from ten to eighteen tons in weight, while a number of municipalities are using horse rollers from five to eight tons in weight. In order that the best results may be obtained rollers are indispensable. Material should be carefully selected and applied. It should then be compressed so that the whole mass would be joined to support the traffic instead of a few individuals or disconnected particles. Grading machines are being extensively used on country roads, and have established their merits in performing the work for which they were intended, but the good results are largely lost in the absence of their counterpart, the roller. When the grader has finished its work the soil is left loose to be displaced readily under traffic and absorb moisture, whereas if thoroughly consolidated by rolling the full benefit would be realized. All machinery should be in charge of one man, the Township Supervisor, and the teams and men required to operate them should be employed by the council for that purpose and should be experienced.

Bridges and Culverts.—In every line of business it has been proven that durable work is the most satisfactory and economical. The construction and maintenance of temporary bridges and culverts is the greatest drain upon the funds of a municipality. Timber is perishable, and being exposed to constant change of wet and dry soon commences to lose its strength, when repairs are demanded and in a few years a renewal. A large amount of this must be done each year, requiring a considerable expenditure, and this is perpetual, whereas if durable material, such as iron, stone and concrete, were used in a few years these structures would be completed and a very large saving effected in maintenance.

Wide Tires.—Narrow tires produce ruts, wide tires produce a smooth and even surface—the one destroys the road, the other preserves it. Narrow tires are almost universal in Ontario. Narrow tired wagons are the greatest destroyers of gravel and broken stone roads. Even with the traffic which is not excessive, our country roads will not be kept in a moderately good state as long as they are subjected to the damaging effect of narrow tires. It is contended that the draft is greater on wide trees; that they set in the ruts made by narrow tires. This will be the case to some extent so long as narrow

tires are commonly used, but these ruts would not exist if wide tires were general. It is further contended that wide tires come in contact with more loose stone on the surface of the road; with roads properly constructed and wide tires used loose stones would disappear. Tires on ordinary lumber wagons should be four inches wide, and this width should increase on all wagons designed to carry greater loads, such increase to be proportionate with the load. The reason, largely, that wide tires are not used in this country is that people are not accustomed to seeing them and studying their effect upon the roads. England and all progressive countries have laws regulating the width of tires according to the load the vehicle is intended to carry.

GOOD ROADS.

By Wm. Irvine, Lamlash.

The subject on which I would venture a few remarks, is one in which all are interested, whether he be farmer, mechanic, merchant, or professional man. We are all desirous of having good roads to travel on, but do we not also have a lingering wish that somebody else would make them for us. Whether that is so or not, one thing is certain, that in the spring and fall our roads are very far from being good. Another fact almost equally certain is that under the present system of making and maintaining them, they never will be good Then the questions arise: First, wherein is the present system lacking, and second, how can it be improved on without increasing the burden of taxation. The road beats in Bentinck are about a mile and a quarter in length on concession roads, and the same length on side roads, making two and a half miles of road on an average for each pathmaster I think I may safely say that while on some of these road-beats good faithful work is done every year, on others a few old hens with hoes would make about as good a showing. I need not refer to the way in which the time is so often put in. The residents on these neglected road-beats are usually the most clamorous to have money spent on their road beat. Now you can see at once the great injustice done to the men who work faithfully, in taking their money to pay for work which should have been done by the statute labor of their less industrious neighbors. The drawback to the present system is that pathmasters are usually changed every year. This custom entails two evils—first, a pathmaster has no chance to form and carry out a comprehensive scheme of improvement; and, secondly, it puts men into the office, occasionally, who are utterly unfit either to plan the work or direct the labor. We have all seen where pathmasters have put clay or earthy matter on the roads in place of gravel, thereby employing labor to destroy the roads. It is scarcely to be expected that intelligent men would care to work very diligently when so employed, as the harder they worked the more damage would be done to the road. Another objection to the present system is, that the work has all to be performed in the months of June and July, a pathmaster having no power to reserve a part of the work for repairs later on. The consequence often is that a road may be cut up badly by a thunder shower in August, and remain till the following June without any repairs. These are only a few of the obstacles in the way of the present system ever becoming a success. The question is often asked, "if you abolish the present system of statute labor, what is to take its place"? Some favor commuting the statute labor for a certain sum per day, and entrusting the township council with the whole work of making and maintaining the roads. I am not in favor of this plan, as I have seen as much waste and misdirected labor under the road commissioners as under the average pathmaster. Without for a moment supposing or implying that the following changes are the best that could be made, but simply giving them as suggestions that may help to draw out still better ideas, I would propose that each pathmaster have a much larger extent of territory placed under his control; that before receiving the office of pathmaster or overseer, he be required to pass an examination, either written or oral, as to his qualifications for the position; and, as we have a Provincial Instructor in road-making, one of the best ways of utilizing his services would be in examining candidates and issuing certificates to capable

persons. That the township council have the appointing of pathmasters from among those holding certificates; that the appointment be a permanent one, subject always to efficient workmanship and good behaviour; that the remuneration given to pathmasters for their services be the same as that now given to members of council when serving as road commissioners; that they have the power to call out the labor at such times as they think best in the interest of the roads, always providing that a farmer should not be called out to work on the road in seedtime or harvest, and always granting to ratepayers the privilege of commuting their statute labor on payment to the pathmaster of a certain fixed sum for each day's labor commuted. The pathmaster should also be entrusted with the expending of all money grants made by the council, and he should be required to give a correct account to the council of all moneys received by him and how expended, all of which should be verified by vouchers. He should also give a report to the council of those who have worked under him, whether performing statute labor or otherwise. One of his chief duties should be to see that the road allowance is not made a dumping ground for stones, stumps or orchard prunings, also that, where it is sandy, holes are not dug at the roadside, as is sometimes done, making travelling at night dangerous. To sum up in a few words, he should have the general supervision of the road from the 1st of January to the 31st of December in every year. I have no intention of discussing in this paper how to construct roads, but would refer you for information on that point to the bulletins that are being issued by the Provincial Instructor in Road-making, and which are sent to every member of every Farmers' Institute.

A Fine Country Road in Huron County.

ENTOMOLOGICAL DEPARTMENT.

ECONOMIC ENTOMOLOGY.

By Prof. J. Hoyes Panton, M.A., Ontario Agricultural College, Guelph.

The study of insects in relation to man has of late years commanded much attention, and is usually referreed to as Economic Entomology. While there are some insects beneficial to man, there are many injurious. Some destroy his food, some injure his clothing, and others attack the animals that are of use to him. Nearly 100 species have been found preying upon his grain and forage crops; upwards of 40 upon his vegetables; 50 upon the grape; 75 upon the apple. The pine has 125 species as enemies; the oak 300; the elm 80; the hickory 170; the maple 75; the beech 150; while the unfortunate willow battles against 400 insect foes. The following statistics show what an immense loss is sustained by man from insects:

1854—The United States lost $15,000,000 by the wheat midge.

1857—Canada lost $8,000,000 by the wheat midge.

1864—The United States lost $73,000,000 by the chinch-bug.

1870—New York State lost $5,000,000 by the cabbage worm.

1873—The Southern States lost $25,000,000 by the cottton worm.

1874—The United States lost $356,000,000 by the grasshopper.

1884—Canada lost $500,000 by the clover midge.

The average loss of the United States from insects during 1884 is calculated to have been $400,000.000, and for 1891, $300,000,000. With such figures before us, in most cases under the mark, we must conclude that the study of a subject that will enable us to lessen this loss is of great importance. Many of our injurious insects have been imported, and with us seem to become more destructive than in the country from which they came. This may be accounted for by their having fewer enemies to prey upon them, such as parasitic insects and birds, and also that wider areas are found here for their feeding grounds. Before giving a description of the insects that are injurious to the products of the garden, orchard and field, let us consider what the general nature of an insect is, and the groups into which they have been classified.

The Parts of an Insect.

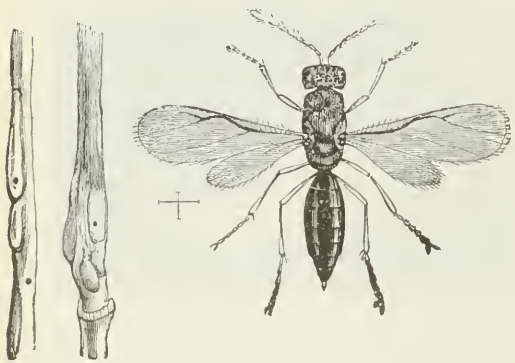


Fig. 1. The Joint Worm (*Isosoma hordei*).

An insect may be described as having three well-marked divisions: head, thorax, and abdomen; one pair of antennæ (feelers); three pairs of legs; usually two pairs of wings; respiration by means of tube-like structures (trachæ); simple and compound eyes, and jointed limbs Most insects undergo metamorphosis—that is, pass through a series of well marked changes in their development from the egg to the adult condition. The following shows the place of the insect in the animal kingdom:

Kingdom.	*Sub-kingdom.*	*Class.*	*Sub-class.*
Animal.	Arthropoda.	Insects.	Hexapoda.

The Arthropoda embraces two classes: *Crustacea*, represented by crabs, lobsters, etc., and *Insecta*. The Insecta contains three sub classes: *Myriapoda*, centipedes and millepedes; *Arachnida*, spiders and scorpions; *Hexapoda*, the true insects. From this it will be observed that spiders are not true insects; they have four pairs of legs and other characters which place them in another division. Among insects we find two typical mouths: the masticatory, or biting, characteristic of beetles and the larvæ of many insects; and the suctorial, or sucking, represented in butterflies and plant-lice. A knowledge of these facts becomes of importance in the application of insecticides. Insects with *masticatory* mouths can be readily poisoned by applying some poison such as Paris Green to their food; but those possessing a *suctorial* mouth must be treated with a substance that kills by contact and not by being introduced into the digestive system. Such insecticides as *Kerosene Emulsion* and *Pyrethrum* powder are suitable for this mode of treatment. Thus, by knowing the nature of the mouths, we are able to suggest what substance is likely to be effective in destroying insects.

Head.—The head of an insect consists of several parts, the most important of which are those that enter into the composition of the mouth, viz, *labrum* or upper lip; *mandibles*, or upper jaws; *maxillæ*, or lower jaws; and *labium*, or under lip. In a masticatory mouth the mandibles and maxillæ are highly developed, while in a suctorial the maxillæ largely constitute the sucking apparatus. Upon the head are borne the *antennæ* or feelers, and the *eyes*.

Thorax.—The thorax consists of three segments, usually distinct, but in some united. The first (*prothorax*) has a pair of legs; the second (*mesothorax*) a pair of legs and a pair of wings; the third (*metathorax*) also a pair of legs and in most cases a pair of wings. The Diptera (flies, etc.) have only one pair of wings. In the absence of a second pair we sometimes find them represented by the so-called "balancers," structures resembling knobbed antennæ. The wings consist of two layers, between which are the structures known as veins or nerves, and certain vessels (*trachæ*) connected with respiration. In the beetles, we find the first pair of wings much thickened. The legs in insects consist of 6 to 9 segments, modified according to the nature and habit of the insect.

Abdomen.—This contains 9 to 11 segments; the last in some females is modified into an apparatus (ovipositor) used in depositing eggs. The digestive system in insects is quite complicated, possessing several well defined organs, such as crop, gizzard, stomach, small and large intestines. The circulatory system varies much; it has no regular and definite course, as in higher animals The heart is a long contractile vessel, situated near the back, and consists of numerous cavities (usually eight) opening into one another by valves; the blood moves in the direction of the head, and passes from the heart to different parts of the body, into small spaces in the tissues, from which it is returned to the last cavity of the heart, and proceeds towards the head, and thus the circulation is kept up. The blood is usually colorless or tinged with green. The respiratory system consists of a series of tubes (*trachæ*) in the body, and from these branches rise, so that the air is conveyed to different parts. These tubes are brought into relation with the outside air by small openings (*spiracles*) usually situated along the sides—two in each segment, one on each side. In some aquatic insects the spiracles open under the wings, while in maggots they are at the posterior end of the body. In all liklihood the wings assist in respiration, for we find trachæ placed along some of the veins between the membranes of the wings. The nervous system consists of a chain of nerve centres (ganglia) located on the lower side of each segment and united by a series of double cords. With this system the organs of taste, smell, touch, sight and hearing are associated. The sense of smell is connected with the antennæ, in which nerves are found and certain pits known to assist it. The sense of taste seems to be connected with the under part of the mouth. The sense of touch is associated with the hairs upon the antennæ, palpi, legs, and even the body. The sense of sight is located in the eyes, two kinds of which are found in many insects—simple and compound. The simple eyes are usually three in number; the compound, two, made up of many divisions called facets. Some butterflies have 30,000 in one eye.

The sense of hearing in grasshoppers is located just behind the first abdominal spiracle; in the locusts it is located in the forelegs. Grasshoppers produce sound by rubbing their legs over their wings; locusts rub the wings upon each other. The muscular system is internal, being located within the limbs, while in higher animals it is external. Most insects lay eggs, but some produce living young, and some *pupæ*.

Fig. 2. The Colorado Beetle.

The developement of an insect is represented by four stages,—*egg*, *larva*, *pupa*, *imago*. The *larva* (*larva*, a mask) is frequently without external organs and has a biting mouth; hence it is a great feeder and usually very destructive to vegetation. The larval condition continues from two to six weeks in most; but there are some in which it is more than a year, e.g., the wire-worm, white grub, and some "borers." *Pupa* (*pupa*, a doll). This is generally a resting condition, which in summer usually lasts but a short time (about two weeks); but if entered in autumn, continues till the next spring. The term *chrysalis* (*chrysos*, gold) is often applied to this stage in butterflies, because in some it is dotted with golden spots. In most moths a *cocoon* is woven around the pupa. The term nymph is applied to the young of such as do not undergo complete metamorphosis in development; in such the young are much the same in appearance as the adult, but smaller, and usually wingless; e.g., grasshoppers, bugs, etc. *Imago* (*imago*, an image). This term is applied to the perfect insect, which is often harmless, as far as feeding upon vegetation is concerned. The following names show some of the common terms applied to these stages in some orders of insects:

Larva	Pupa	Imago.
Borer, grub	"	Beetle.
Maggot	"	Fly.
Caterpillar, or worm	Cocoon	Moth.
" "	Chrysalis	Butterfly.
Nymph	Nymph	Grasshopper.

Classification of Insects.

For convenience in study, insects are divided into seven orders, the classification being based upon the nature of the wings. The number and arrangement of the veins in the wings of insects is of great importance in grouping them into families and orders.

1. Hymenoptera (*hymen*, a membrane; *pteron*, a wing). The insects in this order undergo complete metamorphosis; the mouth is partly masticatory and partly suctorial: the wings are membraneous. In this group we find the architects, manufacturers, and

guards of the insect world, e.g., bees, wasps, ants, saw-flies, and ichneumons. Some have stings as organs of defence (bees), some pierce with an ovipositor, other insects, (ichneumons), and some use the ovipositor for piercing leaves, so as to secure a proper place for their eggs (saw-flies).

2. Coleoptera (*koleos*, a sheath; *pteron*, a wing). This order is a very large one. The metamorphosis is complete; the first pair of wings is much thickened, while the second is filmy, and all have a masticatory mouth, e.g., beetles.

3. Diptera (*dis*, twice; *pteron*, a wing). In this order there is only one pair of wings, and complete metamorphosis occurs. The mouth is suctorial. As many in the larval condition (maggots) feed upon decaying substances, they have been called the scavengers of nature. This order includes flies, gnats, fleas and mosquitoes.

4. Lepidoptera (*lepis*, a scale; *pteron*, a wing). The insects in this group have suctorial mouths, wings covered with scales, and undergo complete metamorphosis, the larva, pupa, and imago being very marked. The moths and butterflies belong to this group, which is one of the largest among insects. Moths usually have feathered antennæ, wings horizontal during rest, pupa generally covered with a cocoon oval in outline, and are most active at night, while butterflies have knobbed antennæ, wings erect during rest, pupa naked and angular, and are most active during the day. The larvæ in this order are termed caterpillars.

5. Neuroptera (*neuron*, a nerve; *pteron*, a wing). This division includes a great variety of forms, which by some are considered sufficiently marked to be placed in separate orders. So widely different are some of the forms here, that this division has been broken up into eight distinct orders. In some, metamorphosis is complete, while in others it is incomplete (that is, the different stages in development are not well-marked). The wings are very full of veins; more so than among the Hymenoptera. The mouth is masticatory. Dragon-flies, May-flies, white ants, lace-winged flies, and bird-lice belong to this division.

6. Hemiptera (*hemi*, half; *pteron*, a wing). Here metamorphosis is only partia the larva and pupa resembling the imago, but wingless and smaller; the mouth is suctorial. The lower part of the front wings in many is much more membraneous than the upper. This order embraces plant-lice, true lice, and bugs.

7. Orthoptera (*orthos*, straight; *pteron*, a wing.) The first pair of wings are straight, narrow, and thickened, while the second, folded like a fan, are membraneous; metamorphosis is partial, and the mouth masticatory. The grasshoppers, locusts, crickets, and cockroaches belong to this group. The orders 1, 2, 4 have always remained the same in classifications adopted from time to time; 3, 6, 7 have been modified very little; but 5 has been much divided. Latterly it has been, as already remarked, divided into eight orders, so that in the most recent classifications we find 16 orders instead of 7, and some entomologists favor a classification containing 19 orders. The following are popular methods of classifying insects:

(a) According to their usefulness.

Beneficial.—The bee (honey); silkworm (silk); cochineal (dye); ichneumon (feeds on injurious insects).

Noxious.—Those affecting the products of the field (midges, etc.) the garden (cut-worms, etc.,); the orchard (borers, etc.)

Neutral—Such as are neither injurious or beneficial.

(b) According to their mode of injury.
External feeders, such as caterpillars, etc.
Internal " " borers, etc.
Underground feeders, such as cut-worms.
Granary pests, such as pea-weevil, etc.
Household pests, such as flies, etc.
Parasites upon domestic animals, lice, etc.

Fig. 3.

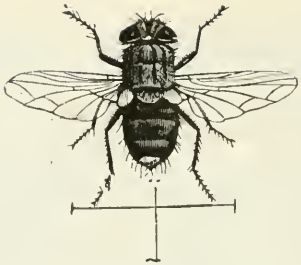


Fig. 4.

Fig. 5.

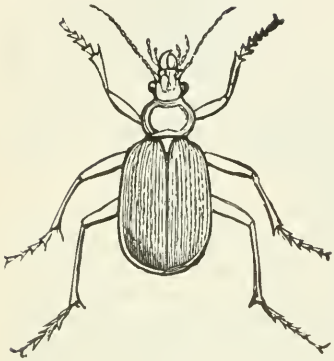


Fig. 6.

Calosoma Scrutator.

Fig. 7.
The Glowing Calosoma.
(*Calosoma calidium.*)

Fig. 8.
The Murky Ground Beetle.
(*Harpalus Caliginosus.*)

Fig. 9.

Fig. 10.

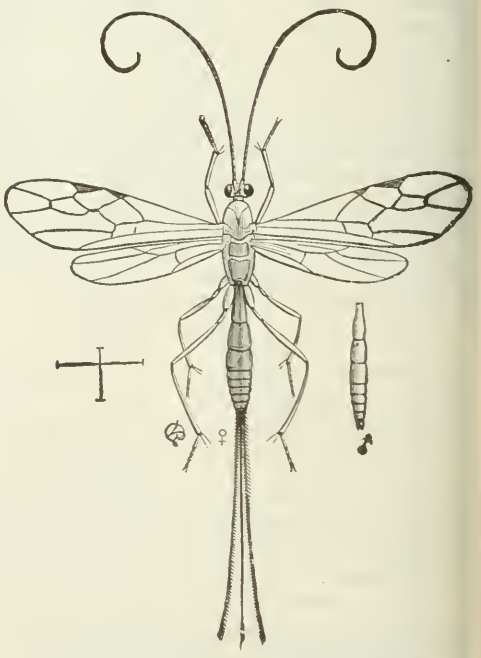


Fig 11.

Fig. 12. Delicate Long-string—*Macrocentrus delicatus.*

Beneficial Birds and Insects.

In the study of Economic Entomology, it is essential that we know something about insectivorous birds, especially such as feed upon injurious insects, as well as to have a knowledge of beneficial and injurious insects. Many investigations have been carried on to learn what insectivorous birds are useful in assisting man to keep in check his insect foes. Thousands of birds have been shot and the contents of their stomachs examined, so as to ascertain with accuracy if the insects eaten were injurious. In some cases as many beneficial insects were devoured as those harmful. The result of careful examination into the subject has been to consider the birds named in the following list as benefactors to the farmer, the fruit grower, and the gardener, and should, as far as possible, be protected and permitted to increase in number:—King bird, pewees, night-hawk, swallow, whip-poor-will, American redstart, yellow billed cuckoo, blue bird, white-bellied nuthatch, red-headed woodpecker, golden warbler, high-holder, hoary-woodpecker, downy woodpecker, red-eyed greenlet, yellow-throated greenlet, Wilson's thrush, brown thrush, cat bird, oriole, meadow lark, indigo bird, song sparrow, grass finch, chipping sparrow, chewink, purple finch, snow bird, American goldfinch, horned lark, wren, chick-adees, golden crowned kinglet, ruby crowned kinglet, and American creeper.

Among the most beneficial insects we find the following in the different orders:

Order Diptera.—Syrphus fly, fig. 3; Tachina fly, fig. 4.
O. Coleoptera.—Cicindela (tiger beetles) fig. 5; Coccinella (lady-birds) fig 9.
O. Hemiptera.—Reduvius (soldier bug) fig 10.
O. Neuroptera.—Chrysopa (lace-winged flies) fig. 11.
O. Hymenoptera.—Vespa (wasps). Ichneumons, fig. 12.

The above insects are of great importance in keeping the injurious insects upon which they prey in check. The ichneumons are very important in this respect. They are very numerous, and prey on many injurious insects, by depositing eggs in the larval forms. These eggs give rise to larval ichneumons that feed upon their host, which finally dies. About this time the ichneumons are developed, and escape as perfect insects. The lady-birds are destroyers of plant-lice; ground beetles prey on the potato beetle and several caterpillars, and the tiger beetles are great devourers of several species of insects.

Methods Adopted to Destroy Insects.

Among the most important methods followed to overcome injurious insects are the following:

1. Use of insecticides, such as Paris green, and kerosene emulsion.
2. Poisonous gas, generated in tents placed over shrubs and trees affected by scale insects, etc.
3. Entrapping the insects, such as codling moth and canker worm.
4. Using barriers to check the progress of injurious forms, such as chinch bug, army worm, etc.
5. Protection of insectivorous birds and beneficial insects.
6. Using parasites, which cause insects to become diseased, such as certain bacteria that are scattered among those to be destroyed.
7. Agricultural remedies, such as rotation of crops, varying the time of sowing, using good seed, using fertilizers, cleanliness in fields, drainage, fall plowing, and summer fallowing.

Insecticides are compounds or mixtures used to destroy insects injurious to vegetation.

Paris Green.—(Arsenite of copper, containing 50-60 per cent. of arsenic). This is applied dry or in solution. In the dry form it should be mixed with 50 to 100 parts of plaster, wood ashes, flour, or air-slacked lime, and dusted upon the affected plants. The form in solution is usually 1 lb. of Paris green to 200 gals. of water; but if the foilage is

tender, 250 to 300 gals. of water may be used. This is the usual strength applied upon the plum and peach. As the green powder does not dissolve, it requires to be kept thoroughly mixed by constant stirring. One pound of lime to every 100 gallons will prevent injury to foilage. The Paris green should be first made into a thin paste, in a small quantity of water, and then added to the full amount of water.

London Purple.—This is an arsenite of lime, obtained as a by-product in manufacturing dyes. It is largely used instead of Paris green; but being more soluble in water, it is not apt to injure the foilage, and, besides, its composition varies considerably, so that when used it is not likely to give as unif rm results as Paris green. These arsenites are excellent against all leaf eating insects.

Kerosene Emulsion.—This is a mixture of coal oil and water.

Riley-Hubbard Emulsion.—Consists of half-pound of hard soap in one gallon of water. Boil till dissolved, and then add two gallons of coal oil, and mix thoroughly for about five minutes. When properly mixed it will adhere to glass without oiliness. This can be done by forcing it through the nozzle of a force-pump repeatedly until the mixture appears complete. It will then form a creamy mass, which thickens into a jelly-like substance on cooling. In using, dilute with nine parts of soft water. This form is very commonly used and is easily prepared. If the foliage is very tender, the emulsion must be more dilute, 15-20 parts water. Whale-oil soap is better than the common hard soap, especially if the emulsion is to be kept for some time. Soft soap may be used instead of hard, using one quart. Where the water is very hard, sour milk may be taken; in that case you require only to mix the coal oil (two gallons) and milk (one gallon) to get the emulsion, the soap not being required. This emulsion is liable to spoil if kept long. Kerosene emulsion is a most successful remedy for plant-lice and scale insects.

Hellebore.—Obtained from the powdered roots of a plant (Veratrum album). May be applied dry or as a liquid. One ounce to three gallons of water. Excellent againt currant worm and cherry slug.

Pyrethrum.—Made from the powdered flowers of the genus pyrethrum a plant of the sunflower family. It should be fresh, and hence should be kept in closed vessels. Used in dry form: one part pyrethrum, five to eight parts flour; or liquid: one ounce in three gallons water. A good remedy for cabbage worm.

Carbolic Acid Emulsion.—One part carbolic acid to five or seven parts of a solution consisting of one quart soft soap, or one pound hard in two gallons water. This, applied to affected trees, destroys bark-lice and borers. It should be well rubbed upon the parts attacked.

Carbolized Plaster.—A mixture of carbolic acid and land-plaster—one pint of the former and fifty pounds of the latter. A remedy against flea-beetles.

Tobacco.—The refuse from cigar manufactories answers the purpose. Take one pound of tobacco to three gallons of water, boil thirty minutes. Add water to make three gallons, and it is ready for use, This is excellent to destroy plant lice.

Alkaline Wash.—A strong solution of washing soda, mixed with soft soap until about as thick as paint. Applied to the trunk of trees, destroys the borers, and gives a healthy, vigorous tone to the tree.

Carbon Bisulphide.—This colorless liquid is a most effectual remedy to get rid of insects in granaries, but great care requires to be taken as it is very inflammable and explosive and may lead to serious results if any fire is brought near; even a cigar or pipe, used where the vapor is being evolved may prove disastrous. It readily volatilizes; the vapor is heavier than air, and is deadly to insect life. In using it the liquid may be placed in a small shallow vessel and put on top of the grain in bins or barrels. These are covered so as to keep in the vapor, which sinks down through the grain, destroying insect life wherever it comes in contact with it. After the operation is over the grain will lose all odor in a short time if exposed to the air. Some prefer taking a wad of cotton or tow saturating it with the liquid, then plunging it into the middle of the bin and leaving it.

Two or three bunches, thus placed among the grain will soon kill all such pests as are found in it. One ounce is about sufficient for two bushels of grain. In giving the remedies referred to in the following pages, wherever Paris green is mentioned, and no proportions named, it is understood to be the common formula: One pound of Paris green to 200 gallons of water. This also is the case where hellebore and pyrethrum are recommended. It is considered unnecessary to repeat the remark in each case, that where the vigor of plants can be increased by the use of fertilizers, it is well to use them. A strong, healthy, plant is always in a much better condition to withstand the attack of insects than a weakly one. Thorough cultivation and cleanliness are always to be followed as far as possible; a want of the latter in many cases leaves sheltering places for injurious insects, which are enabled to winter favorably and become a trouble the following season. Whereas if weeds, etc., were not allowed to grow, no hiding places would be furnished, and many would perish from exposure. In nearly all cases, Paris green is an effectual remedy against insects that feed by chewing but in cases where its application might affect the fruit, some other remedy must be adopted. Kerosene emulsion is also a most successful general remedy when applied upon insects that feed by sucking the juice of plants, such as plant-lice. We thus have two insecticides which cover almost every case, and are no longer required to learn a different remedy for each pest, as was necessary not many years ago The application of insecticides has also been made comparatively easy by the invention of spraying machines which are rapidly becoming an important factor in gardening and fruit growing

Injurious Insects in the Order Hymenoptera.

There are not many injurious insects in this order—the principal being those known as saw-flies, so-called because some of them are supplied with an ovipositor, with which they can bore into leaves and deposit their eggs.

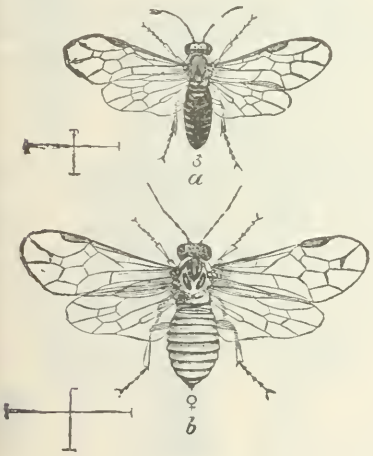


Fig. 13.
The Saw Fly.
(*Nematus ventricosus*)

Fig. 14.
Larva of Saw Fly nearly full grown—feeding.

Currant Worm (*Nematus ribesii*) This insect is very troublesome upon currant and gooseberry bushes It lays its eggs early in the spring, on the under side of the leaves, in rows along the veins. These hatch in about ten days and the young worms appear. The *larva*, when full-grown, is about three quarters of an inch in length, of a greenish color, spotted with dark spots, and has many legs. It spins a brown cocoon of paper-like texture, which is found sometimes on the ground among the dry leaves or on the bush attached to the stems or leaves. This represents the *pupa* condition. The *imago* appears in about two weeks after the pupa stage has been entered. The male is much smaller

than the female, the body black with some yellow spots above, while in the female the body is mostly yellow. Both have four membraneous wings. A second brood is of common occurrence. Remedies: (1) Hellebore, one ounce in three gallons of water. It may also be applied as a dry powder, mixing it with three or four parts flour. (2) Paris green for the first brood, but care must be taken not to continue this if the fruit is likely to be affected,

Pear-Tree Slug (*Eriocampa cerasi*) The eggs are laid about June, in semi-circular incisions made through the skin of the leaf by the insect's ovipositor. *The larva* is about one-half inch in length and is thicker towards the head, of a somewhat greenish black color, and slimy. It has many legs and gives off a disgusting odor. The *pupa* is in the ground, two or three inches below the surface, in an oval cavity. This condition lasts two weeks. The *imago* is a small, four-winged black fly, about one fifth of an inch long. There are usually two broods. This insect may be found attacking the pear, plum, and cherry. Remedies: (1) Spraying with Paris green, hellebore, or pyrethrum, in the common proportions; (2) Fresh-slacked lime, dusted upon the trees.

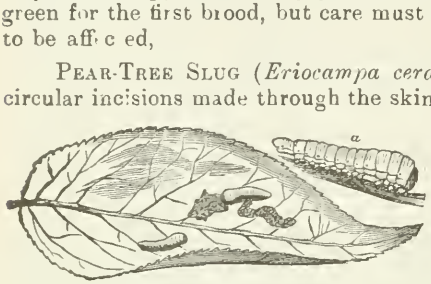


Fig. 15. Pear Tree Slug.

Raspberry Slug (*Selandria rubi*). The eggs of this saw-fly are also deposited beneath the skin of the leaf. The *larva* is dark, greenish, covered with transverse rows of white spines, and about half an inch long. The *pupa* is in the ground. The *imago* is a small four-winged black fly, which lays its eggs in the leaves of the raspberry. Remedy: Spray hellebore, one ounce to four gallons of water.

Strawberry Slug (*Emphytus maculatus*). The eggs are deposited in the leaf or stem. The *larva* is pale green, about three-fourths of an inch long. It enters the ground and becomes a *pupa*, from which the *imago* imerges as a small, black, four-winged fly, with two rows of distinct white spots on the body. Remedies: (1) pyrethrum powder dusted upon the plants. (2) Paris green, if another brood appears after the fruit is gathered.

Injurious Insects in the Order Coleoptera.

This is one of the largest orders among insects, and in it are many injurious to vegetation. The stages in development are well marked.

Turnip Beetle (*Phyllotreta vittata*). The eggs are laid upon the roots of the turnip. The *larva* is about one fourth inch long, and feeds to some extent upon the roots. It passes the *pupa* stage in the ground. The *imago* is a small, shining, black beetle, with a yellowish, wavy stripe on each wing-cover, and is only about one tenth inch long. It feeds upon the leaves, not only of the turnip, but also of the cabbage and the radish; sometimes doing much damage. It passes the winter beneath clods of earth, etc., and in spring attacks plants of the *cruciferæ* order. It cannot do much harm after the fourth leaf comes upon the turnips. Several broods may appear in the season. Remedies: (1) Paris green, mixed with twenty-five parts flour, or fifty plaster, by weight, dusted on the plants while the dew is on. (2) Some claim that if the seed is soaked in coal oil and dried with lime, it will be successful in keeping the beetle away. (3) Coal oil mixed with sand and scattered on the plants. (4) Tobacco powder dusted on the plants gives good results; or tobacco solution, one pound to two gallons water.

Fig. 16. Turnip Flea Beetle.

Potato Beetle (*Doryphora decem-lineata*) (See Fig. 2). The deep orange-colored eggs of this insect are laid in clusters (30-60) on the under side of the leaves, and hatch in a week. The *larva* is a voracious feeder; when fully developed it passes into the ground, where the *pupa* stage continues for ten days. The *imago*, (about half an inch long and oval in outline), has five black stripes on each wing-cover, the general color

being a yellowish brown. One female will lay as many as 700 eggs, while one pair in a season may be the parents of 38,000,000. When this insect is disturbed it drops from the leaf. Many parasites prey upon the potato beetle, yet it survives against all its foes. Its native home is on the eastern slope of the Rocky Mountains. In 1874, it reached the Atlantic States. This pest is too well known to require further description. Remedies: (1) Paris green, with fifty times its weight of flour, or one hundred parts of land-plaster, dusted on the plants. Paris green is generally applied in solution, using about one pound to one hundred gallons of water. (2) Shaking the vines and collecting the dropping beetles.

Cucumber Beetle (*Diabrotica vittata*). The eggs are deposited in the soil about the stems of the plants, and as soon as hatched the *larva* feeds upon the roots. It is about half an inch long, with three pairs of legs in front and a leg-like structure on the last segment. It passes the *pupa* condition in the soil. The *imago* is about one-fourth of an inch long, and is somewhat yellow with black stripes on its back. It feeds upon the leaves and stems of plants attacked, and passes the winter as a beetle under any rubbish that will afford shelter. It feeds upon the squash and melon, as well as upon the cucumber, and is a very difficult insect to overcome. Remedies: (1) About the only successful remedy is to cover the plants with boxes, having fine gauze netting for the bottoms, or to make frames of hoops covered with netting, so as to form a kind of dome over the plants. (2) A liberal use of tobacco powder has given good results. (3) Some report success from sprinkling soot.

Grape Vine Beetle (*Haltica chalybea*). The eggs are deposited on the under side of the leaves. The *larva* is about one-third of an inch long, brownish, with several black dots on the body. The *pupa* condition is passed in the ground, and continues for about

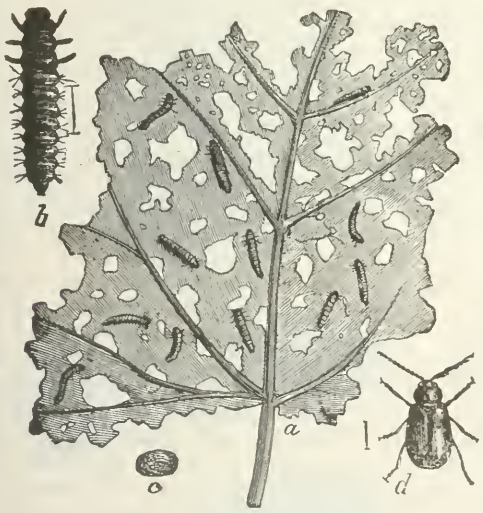


Fig. 17. Grape-Vine Flea Beetle.

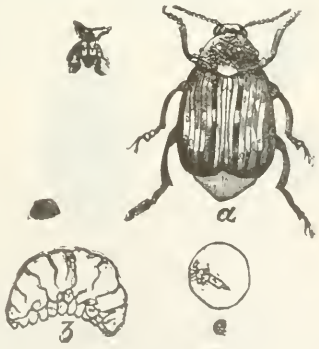


Fig. 18. The Pea Weevil.

three weeks. The *imago* is a small polished beetle, about one-fifth of an inch long. It passes the winter in sheltered spots, under leaves, or around the roots, and is very destructive in spring to the young buds, and afterwards, in the larval condition to the

leaves. Remedies: (1) Paris green, three ounces to fifty gallons water. (2) Dust pyrethrum powder upon the vines attacked. (3) Jarring the vines in the morning and collecting the beetles.

Pea Weevil (*Bruchus pisi*). The eggs are laid on the pods, as soon as they are formed and the seeds set. The *larva*, as soon as hatched, bores into the pod, reaches the peas and works into them, eating much of the substance, but leaving the germ untouched. The *pupa* is in the pea, where it can readily be seen. The *imago* emerges in spring, as a small beetle, about one-fifth of an inch long, dark colored; head well bent under the body, which is oval in outline; short antennæ, and the wing covers shorter than the body. Sometimes the *imago* appears in the autumn, and passes the winter in some sheltered place. Remedies: (1) Sow uneffected peas. Seed containing bugs will germinate, but do not produce vigorous plants. (2) Seed kept over for a year in closed vessels will be free of bugs, as they would be dead by that time. (3) Heat the peas to 145° F., as soon as gathered. (4) Place the grain in an air tight vessel, pour some carbon bisulphide in a saucer on top, and cover the whole up for forty-eight hours. The heavy vapor will sink among the peas and destroy the bugs or any insects in or among the grain. One ounce is said to be sufficient for 100 pounds of grain. As this compound is very inflammable and volatile, great care should be taken not to bring any light near it. Lately a case came under the writer's notice, where a person had used this substance by simply placing it in an open vessel and setting it among the grain without covering the hole to keep the vapor in and, of course, much of its effects were lost, while at the same time this inflammable vapor was to some extent escaping in the granary and barn, where it might have been ignited from a pipe or match, and led to serious results. If the peas treated are exposed to the air a short time, the offensive odor will pass away.

Plum Curculio (*Conotrachelus nenuphar*). The egg of this insect is deposited in the plum. The *larva* burrows in the fruit, where it matures in three or four weeks. That effected soon falls to the ground and the larvæ leave the plums, pass into the ground, and become *pupæ*, in which condition they remain for about six weeks. The *imago* is a small greyish brown beetle, one-fifth of an inch long, with a black hump on the middle of each wing case. It has a curved snout and a stout body. The beetles conceal themselves during the winter in sheltered spots, and appear in the spring about the time the trees are in bloom; but some pass the winter in a *pupæ*. This insect does not confine itself to plums, but is found upon the cherry, peach, and even apple. A single female may lay as many as two hundred eggs. In laying her egg, she first makes a small hole in the plum; into this the egg is placed; she then cuts the crescent marking around it; this is supposed to be done for the purpose of checking the growth of the cells near the egg and thus prevent its being injured. Plums marked in this way are said to be "stung"—a rather poor term, as the mark is made with the insect's curved snout. Remedies: (1) Jarring the trees morning and evening. Where this is done very many beetles drop from the tree, and may be collected upon a sheet placed below. Many plum-growers prefer this to any other remedy. To prevent injury to the tree, a limb may be sawn off, leaving a small part which can be used to strike against so as to jar the tree. (2) Gather and destroy the affected plums as they fall. (3) Spray Paris green, one pound to about two hundred and fifty gallons of water; especially if the foliage is tender two pounds of lime added will prevent injury to the leaves. Spray once before the leaves bloom, as soon as the foliage is well started; again as soon as the petals fall, and repeat in about a week.

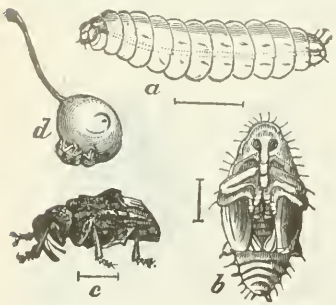


Fig. 19. The Curculio.

Wireworm—Click Beetle (*Melanotus*). The eggs are usually laid in grass land. The *larva* is several years in developing, generally three. As there are several species that are known as wireworms, we shall give the general character of the larvæ:—Long, slender, one-half to one inch in length, yellowish brown, hard and wire-like, with six legs at one end. They attack the roots about one inch below the surface, and burrow deeper during winter. *Melanotus communis* and *Agriotes mancus* are among the most common; the former are about one inch long, and twice as thick as the latter, which is not over half an inch in length. The *pupa* stage is entered in early fall, and soon changes to a beetle. At this stage the insect is very tender, and does not leave the cavity in which it was pupa until spring. The *imago* is a dark gray beetle, in most species, and when placed on its back is able to spring over with a sort of click; hence, the name "click beetle" is sometimes given to the insect. The larvæ of these beetles do great damage to grasses, grains, corn, and potatoes. They are sometimes confounded with centipedes and millipedes, both of which have many legs, while the wire-worms have only six. At Cornell Experiment Station, this insect was very thoroughly studied, and all the remedies known tried. The result was that scarcely one of them proved a success. One of the most important results attained by the investigations was that when the *imagoes* are first developed in the pupa cells, they are very tender, and that if the cells in the earth be broken in the fall, the beetles die. Remedies: (1) Fall plowing. (2) Pieces of potato put in the ground will attract these worms, and if examined from time to time will be found to contain wireworms, which may be destroyed. This is only practicable in gardens and small areas badly affected. A small stock may indicate where the potatoes are. (3) Salt has a tendency to drive the worms down into the ground, and thus give the crop time to make some headway and withstand the attack. (4) Small bunches of freshly cut clover, about one-fourth pound in weight, poisoned by wetting with Paris green water, attracts the beetles, which feeding upon them are poisoned. (5) It is claimed by some that a crop of buckwheat will prove successful in freeing ground from wireworms. (6) White mustard is considered a remedy against the wireworm, and where used as a green manure has been followed by good results.

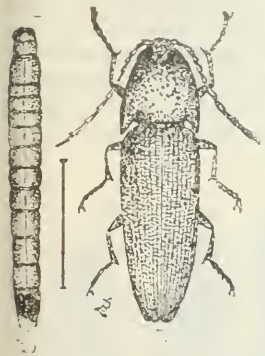


Fig. 20. *Melanotus communis*. *a* larva. *b* adult. (after Bruner.)

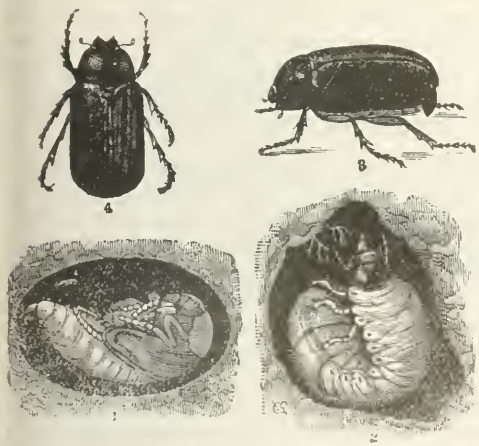


Fig. 21. The White Grub.

White Grub—May Beetle (*Lachnosterna fusca*). The eggs are laid at the roots of grass. The *larva* is a large, soft, white grub, about an inch and a half long, usually curled at the posterior end. It takes three years to develop, and is sometimes very destructive in old pastures, and in gardens, to strawberry plants. The *pupa* is in the ground. The *imago*, an inch long, is a large, plump, brown beetle, often observed buzzing around in the summer evenings, about the end of May. It feeds upon the foliage of the cherry and plum. Remedies: (1) Spraying with Paris green for the beetles. (2) In gardens, dig up the plants attacked and kill the grubs. (3) Fall plowing. (4) Summer fallowing. Many birds are very fond of these grubs.

Rose Bug or Rose Chafer (*Macrodactylus subspinosus*). This insect attacks many plants, such as grape, rose, cherry, apple, plum, pear, and peach. The eggs are laid

beneath the surface of the ground, and hatch in about two weeks. The *larva* feeds on the tender roots of grass, etc., and spends its first season in the ground, where it hibernates. The *pupa* stage is entered in spring. The *imago* appears about the time the grapes are in blossom, and becomes a very serious pest. It is in this stage that the insect is the most injurious. Fortunately the beetle lives only a month. It is about half an inch long; has a slender body; long, sprawling legs, and is of a brownish color; covered with a sort of yellow-gray down that can be rubbed off. This is a difficult insect to overcome. Remedies: (1) Spraying with a mixture from three or four pecks of freshly slacked lime and one quart of carbolic acid in fifty gallons of water. (2) Kerosene emulsion. (3) Jarring the vines attacked, in the morning, will secure many.

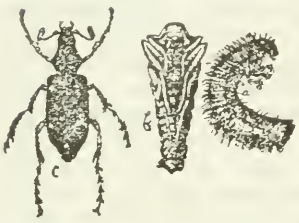


Fig. 22. The Rose Chafer. Adult, pupa, and larva. After Riley.

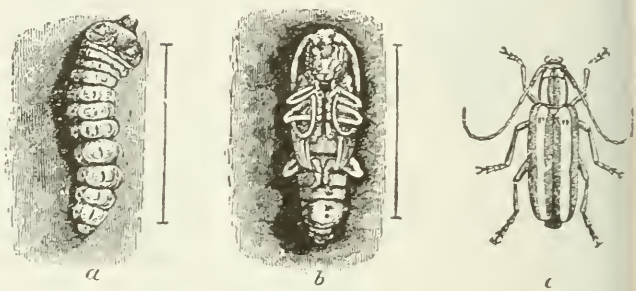


Fig. 23. Round Headed Apple Tree Borer. *a* larva, *b* chrysalis, *c* beetle.

Round Headed Borer (*Saperda candida*). The eggs are deposited about June, near the base of the trunk of the apple tree. The *larva* eats its way through the outer bark to the inner, and takes about three years to develop. It works in the sap-wood, where it forms flat, shallow cavities, filled with saw-dust-like castings. These are often seen on the bark, and indicate where the "borer" is at work. As it reaches maturity it cuts a passage upwards into the solid wood, and then curves toward the bark. In this channel it enters the *pupa* stage about spring. When fully developed it is an inch long, with a round head that distinguishes it from the flat-headed borer, which also affects the apple tree. The *imago* is a slender beetle, one inch long, with two broad, whitish stripes on the wing-covers, and long jointed antennæ. It appears about June. Remedies: (1) Examine the trees in autumn, and where the saw-dust-like castings indicate the presence of the "borer," a stiff wire may be pushed in and the larva killed, or sometimes the larva can be cut out with a knife. (2) About the beginning of June, apply the following mixture to the trunk of the tree: One pound of hard soap, or one quart soft, in two gallons of water; heat to boiling, and add one pint crude carbolic acid; make a second application in three weeks. This can be well done by using an old scrubbing-brush to rub it in.

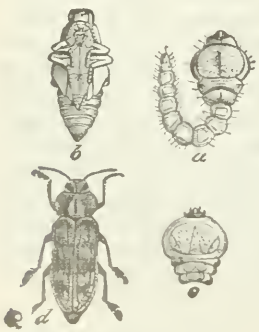


Fig. 24. Flat-headed Borer.

Flat-headed Borer (*Chrysobothris femarata*). This insect also attacks the trunk of the apple tree, but lays its eggs higher up the tree than the preceding one. The *larva* is a pale yellow, an inch long, and has a well marked flat head, much wider than the body. It is sometimes found even in the limbs, and is not so long in developing as the round-headed borer. It cuts flat channels in the sap-wood, and sometimes girdles the tree. Castings and discolored bark indicate its presence. It finally bores into the solid wood, and becomes a *pupa* for about two weeks, and then emerges as an *imago* about half an inch long, somewhat flat, and of a greenish-black color, with three raised lines on each wing-cover. The legs and under side of the body present a coppery lustre. Remedies are the same as for round-headed borer.

Clover-Root Borer (*Hylastes trifolii*). The eggs are deposited at the crown of the root. The *larva*, about one-eighth of an inch long, burrows down into the root, where, after a time, it becomes a *pupa*. The *imago* is a short, thick-set, brownish-black beetle, one tenth of an inch long. It may spend the winter as *larva*, *pupa*, *or imago*. It is in the second year of the clover that it becomes most injurious. Remedy: Mow the clover but once, and pasture or plow under the second growth. Frequent rotation of the clover crop seems to be the only preventative.

Fig. 25. The Clover-root Borer.

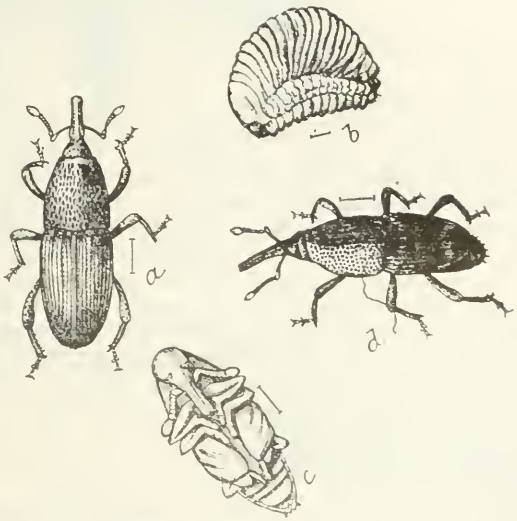


Fig. 26. *Calandra granaria*, Linn; *a*, adult; *b*, larva; *c*, pupa.

Grain Weevil (*Calandra granaria*). This insect is a very small beetle, one-eighth of an inch long, found among grain in the granary. It has a well-marked mouth, and is of a brownish color. The writer had several specimens sent him from different parts of Ontario during 1894, showing that it is more common than formerly. Remedy: The best remedy for this and all other pests among stored grain is carbon bisulphide. The grain may be put in a barrel, and the liquid poured into a saucer placed on the grain, then cover the whole so as to keep in the vapor, which will sink down among the grain and kill every insect. One ounce is about enough for one hundred pounds of grain. It must be remembered that vapor of this substance is very inflammable.

The Buffalo Carpet Beetle (*Anthrenus scrophulariæ*). This is an European insect, which is reported as having been imported into the United States about 1874. During the present year specimens have been received from several parts of Ontario, showing that it is being well distributed here. It is comparatively harmless in Europe. The adult insect is a small beetle, about three-sixteenths of an inch long. It is covered with small scales, which give it a somewhat mottled appearance. There is an irregular red stripe down the middle of the back. The antennæ are composed of eleven joints, the last three being much larger than the rest. Like the potato-bettle it feigns death when

disturbed. This bettle lives upon flowering plants, and is frequently found on the spiraea, yarrow, and some other plants of the compositæ. It lays its eggs on woolen material; these hatch and produce the larvæ, which become very serious household pests. The larvæ are found feeding upon the woollen substance in the cracks of the floor, below carpets and also in the carpet itself. The larva is about a quarter of an inch in length, and is covered with coarse brown hairs, arranged in tufts on the head, and along the sides and end of the body. In autumn the larva changes into the pupa and passes the winter in that stage, and the beetle emerges in spring. Remedies: (1) Where carpets are infected they should be taken up, well beaten, and sprayed outside with benzine. If exposed for a few hours the smell of the benzine will pass off. The floors from which the carpets have been removed should be well washed with hot water. (2) Sometimes damping the carpet on the floor and running a hot iron over it at the points infested will prove very beneficial. (3) Corrosive sublimate (60 grains dissolved in a pint of alcohol) brushed over the floor at the edges before the carpet is laid, and on the underside of the carpet, is a good remedy; but it must be remembered that this is very poisonous, and that it is not safe for children to play on a carpet thus treated. (4) In the case of clothing, blankets, etc., the application of benzine may be followed, but in all cases where it is used, remember that it is very inflammable and that no lights should be near during its use. Both benzine and corrosive sublimate kill this insect readily, but as the one is very inflammable and the other poisonous, great care must be exercised in their use.

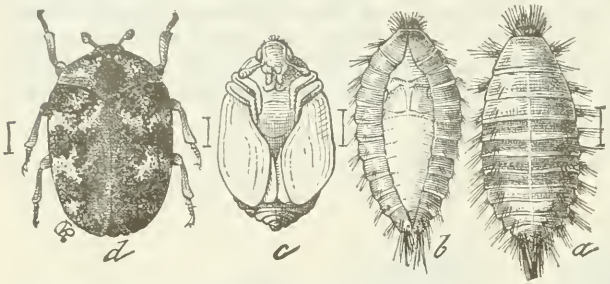


Fig. 27. The Buffalo Carpet Beetle. *Anthrenus scrophulariæ*. Linn. *a*, larva; *b*, skin of larva; *c*, pupa; *d*, beetle. All much enlarged. (After Riley.)

Injurious Insects in the Order Lepidoptera.

This very extensive order, embracing the moths and butterflies, contains many enemies to the fruit grower and vegetable gardener. Many of the larvæ of these insects are voracious feeders upon the foliage of trees and other plants. The different stages in development are very marked in this group.

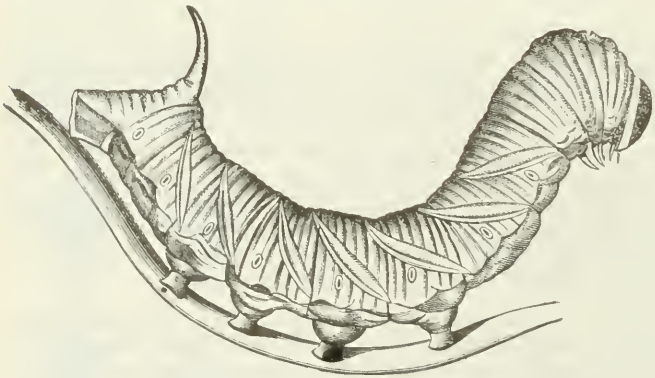


Fig. 28.—The Plum Sphinx and Chrysalis.

Fig. 29.

Plum Sphinx *(Sphinx drupiferarum)*. The eggs are deposited singly upon the leaves. The *larva* is fully three inches long, and thick in proportion, of apple-green color, with seven oblique white bands on each side, bordered in front with light purple.

The air spiracles or breathing pores on the side of each segment are very marked. A long, horn-like structure is on the last segment. The brown *pupa* case in the ground is

Fig. 30. The Plum Sphinx Moth.

naked, and has a short tongue-case. The *imago* is a large, grayish-colored moth, with strong wings tapering to a point, which, when expanded, are three and a half inches across. Remedy: Hand-picking, as there are not likely to be many, and they are readily seen.

Tomato Worm (*Phlegathontius celeus*). Fig. 31. The eggs are deposited on the leaves of both the tomato and the potato. The *larva* is three inches long, and has a horn-like structure on the last segment, and the breathing pores are very distinct. The

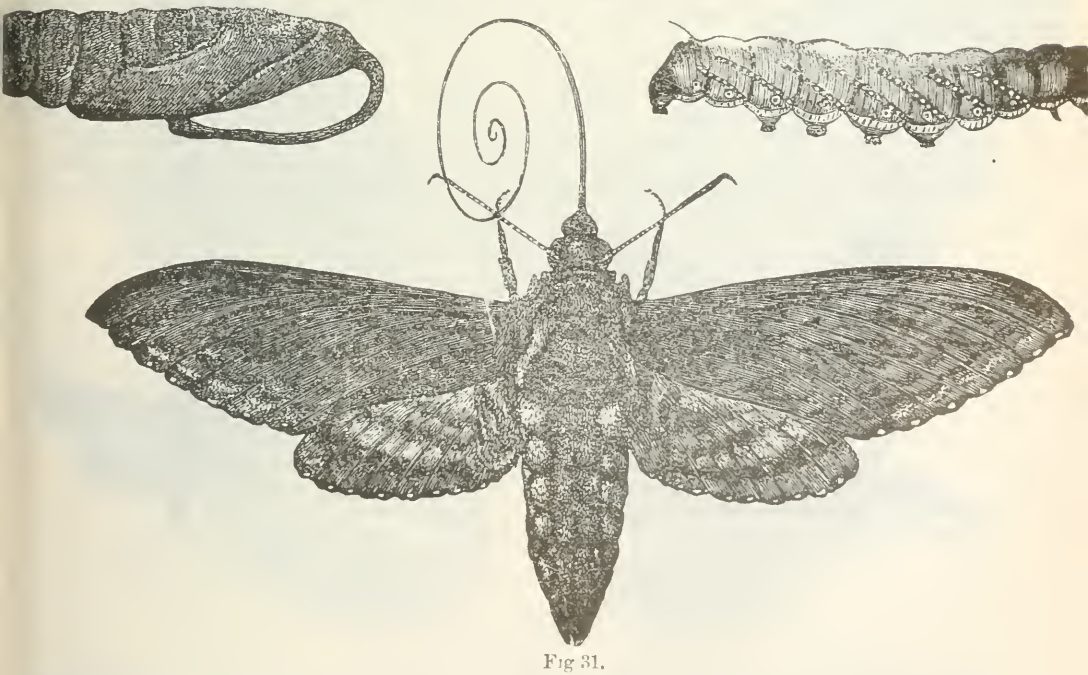


Fig 31.

general color is a light green, with oblique whitish bands on each side. The *pupa* case resembles that of the plum sphinx, but has a much longer tongue-case, and is also in the ground. The *imago* is a large, gray moth, with five orange spots on each side of the body. Remedy: Hand-picking, or Paris green.

Grape Sphinx (*Darapsa myron*). This sphinx preys upon the grape. The *larva*, two inches long, with red feet, is pale green, with pale yellow stripe down each side. Seven spots, varying in color, are along the back. The *pupa* is in a cocoon, formed by a

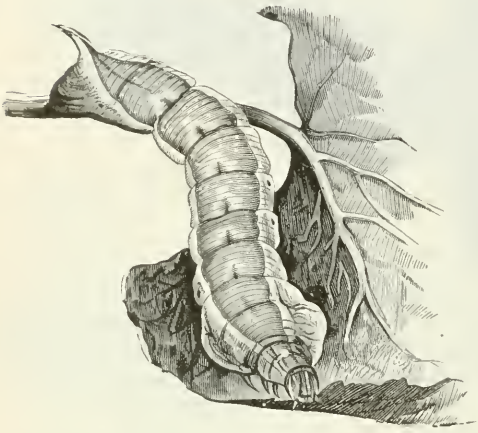


Fig. 32.

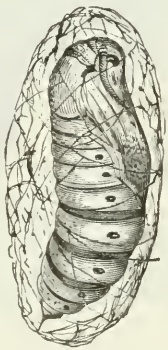


Fig. 33.

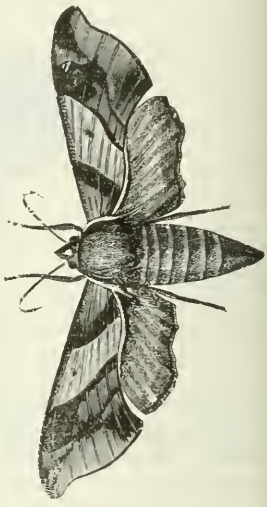


Fig. 34.

few leaves being drawn together. The *imago* appears about May. The spread wings measure about two and a half inches; the fore wings are dark olive-green, crossed by bands of greenish-gray, while the hind ones are reddish. Remedy: Hand-picking.

Cutworms (*Agrotis, Mamestra, Hadena*). The cutworms, which are found generally doing so much damage to garden crops, usually belong to one or other of the above genera — many of them to Agrotis. As their characters are much alike, we shall refer to them in general terms The *larvæ* are about one and a half $\frac{5}{8}$ inches long; smooth, naked, and presenting a greasy-looking appearance. The color varies, but is generally some shade of green, gray, brown, or black, and most

Fig. 35. The Zebra Caterpillar.

Fig. 36. Dark-sided Cut Worm.

are night feeders. When disturbed, they curl up at both ends. Some confine their ravages to the ground, and are known as the "ground cut worms." Among the most common are the *Agrotis ypsilon, A. subgothica, A. tessellata*. Others, which defoliate

trees, are termed "climbing cut-worms," the most common being *A. saucia*, *A. Cochranii*, *A. scandens*, *A. Claudestina*. The *pupa* stage is passed in the ground. The moths appear in midsummer. Most have the front wings of a mottled-gray appearance, with some spots; the hind wings are of a much lighter color. The expanded wings measure one to three inches across. Remedies: (1) Paris green, sprayed upon trees attacked by the "climbing cutworms," will be successful. (2) In gardens, poisoned baits may be successfully used, such as small bunches of clover, cabbage leaves, etc., dipped in Paris green solution, (one pound Paris green to one hundred gallons water,) and placed near the attacked plants. The cutworms will feed upon these and be destroyed. (3) When putting out cabbage or tomato plants, they may be protected by putting a piece of paper around them in such a way as to prevent the worm getting at the stem. (4) Dig out the worms and destroy, where plants have been eaten. (5) To protect corn, put the seed in a vessel and pour in enough water to keep it well covered after it swells. Add one and a half pounds of copperas dissolved in warm water to each bushel; stir well and allow the corn to remain in the mixture 24-30 hours, and stir from time to time while soaking. Now take out the seed and sprinkle some land plaster over it so as to dry it, and it is ready for planting. (6) When the corn is planted sprinkle on each hill over the covered grain about one tablespoonful of salt. This has been very successful in protecting the young plants from cut-worms.

Cecropian Moth *(Samia cecropia)*. This is one of our largest moths. The *larva* is sometimes found feeding upon the leaves of the apple, but it is so large that it is

Fig 37. Cecropia Emperor Moth.

readily seen and may be picked off. The eggs of this insect are of considerable size and of a brownish color. The *larva* is four inches long; pale green; the third and fourth segments bear coral-red warts, the others have yellow, except those on the second and

last, which are blue. It is about an inch in diameter. The *pupa* is in a cocoon fastened to the side of a twig. The cocoon consists of an outside tough layer, and an inside loose

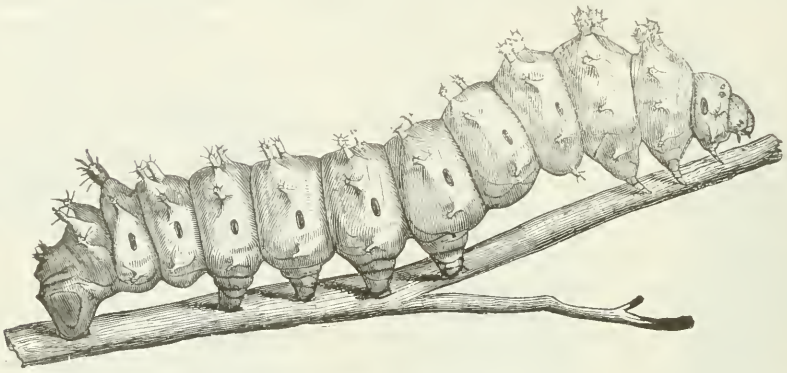


FIG. 38. Cecropian Emperor Caterpillar.

one. It is three inches long. The *imago* is a very large and beautiful moth, measuring from five to seven inches across the expanded wings. The wings are brown, the front

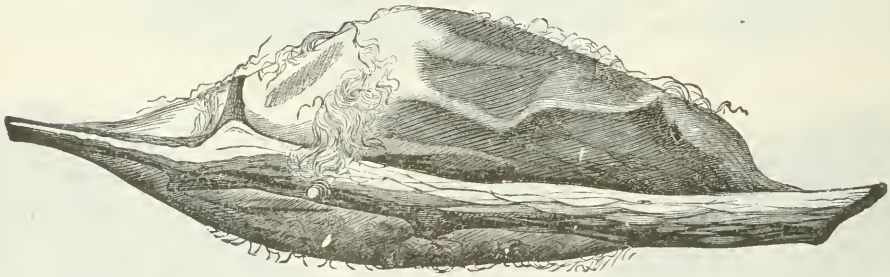


FIG. 39. Cocoon of Cecropia.

being somewhat reddish. Near the middle of each is a kidney-shaped white spot. The front wings, near the tip, have an eye-like spot, and near the shoulder are of a dull red color. Remedies: (1) Hand-picking. (2) Gathering the large cocoon readily seen on the trees.

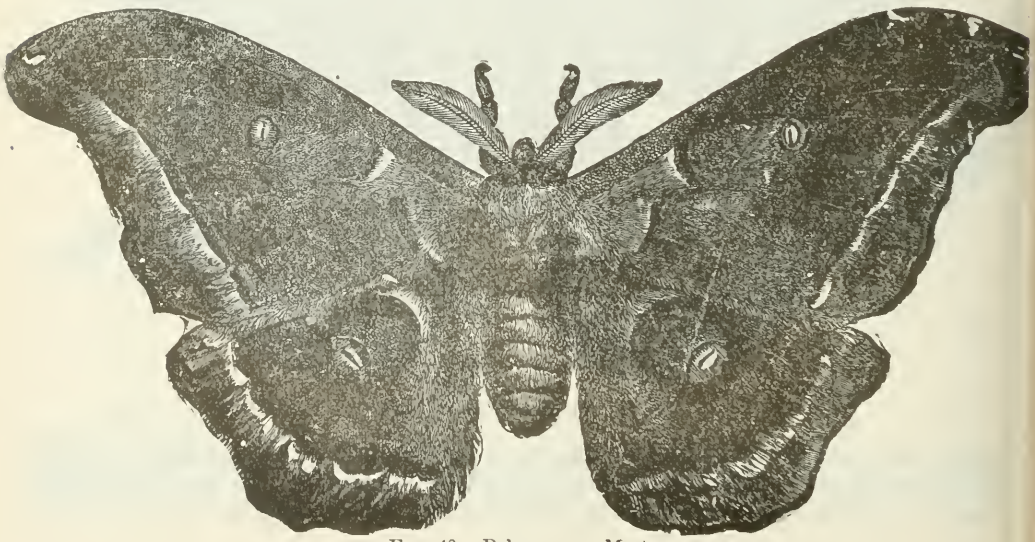


FIG. 40. Polypnemus Moth.

Polyphemus Moth. *(Telea polyphemus)* This is another large and beautiful moth, resembling the Cecropian, but is yellowish-brown in color, and not quite so large.

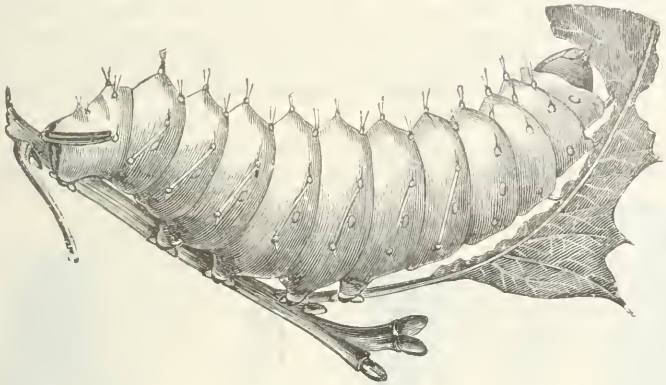


Fig. 41. Polyphemus Caterpillar.

The eggs are large and cream-colored. The *larva*, usually upon the plum, is three inches long, and much thicker in the middle, tapering towards each end; this serves to distinguish it from many of the other *larvæ*, which are about the same thickness the whole length of the body. There is a V-shaped band on the last segment. The *pupa* is in a compact cocoon, with some leaves interwoven in it, and is of an oval outline. It usually is found upon the ground. The *imago* is a large, ochre-yellow moth, five to six inches across the wings. An eye-like spot is near the middle of each wing, bordered with yellow. Remedy: Hand-picking. A large Ichneumon (*ophion macrurum*) frequently preys upon the larva of this and the Cecropian moth.

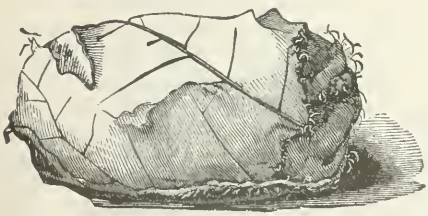


Fig. 42. Polyphemus Cocoon.

American Tent Caterpillar. *(Clisiocampa Americana).* The eggs are deposited on small twigs in ring-like clusters, oval in outline, two to three hundred in a mass, and the whole coated with a sort of varnish. The *larva* is hairy, with a white stripe down the centre of the back, and is two inches long. They construct "tents," or silken webs, in the forks of the branches; these they leave morning and evening to feed upon the foliage of the trees attacked (usually the apple). The *pupa* is in a cocoon, generally found beneath the top board of fences and similar places of shelter. The covering consists of two layers, with a sort of sulphur-like substance between. The *imago* is a reddish-brown moth, with two oblique whitish lines across the wings, which measures one and one half inches when spread. *Clisiocampa sylvatica*, the forest tent caterpillar, is another species in the same genus, found also preying upon the foliage of the

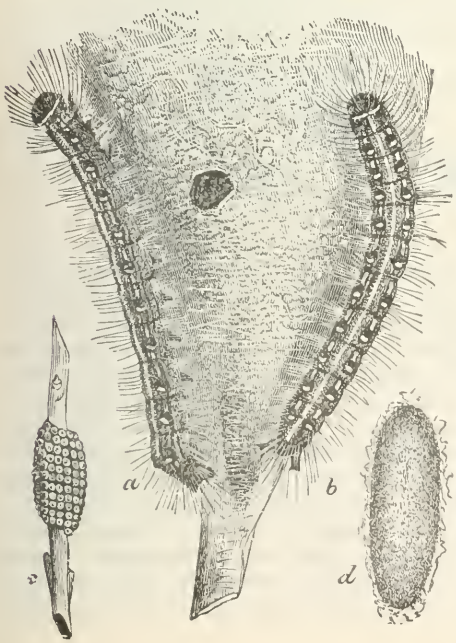


Fig. 43. ½ Tent Caterpillar.

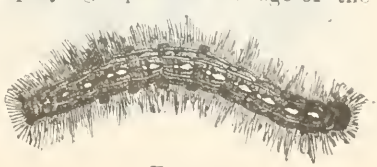


Fig. 44.

apple tree. The principal points of difference are: The egg mass is not oval in outline, but is cut off squarely at each end; the larva, instead of having a white line down the back, has a series of white dots, and the oblique line on the wings is darker than in the preceding; otherwise the two species bear a close resemblance to each other in appearance and habit. They feed upon several forest trees as well as on the apple. Remedies: (1) Collect and destroy the egg clusters in winter. (2) Crush the "tents" when full of caterpillars. (3) Apply Paris green.

Tussock Moth (*Notolophus leucostigma*). The eggs are in clusters on dried leaves, which remain attached to the tree. The *larva* is an inch long, yellowish and hairy; the

Fig. 45.—Tussock Moth.

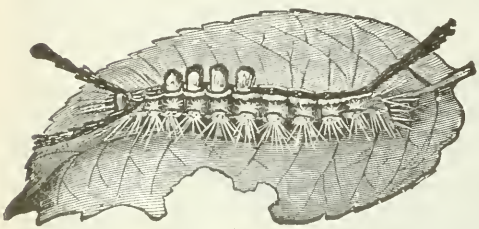


Fig. 46.

head and two wart like structures are red; these are followed by four cream-colored tufts along the back. Two long black plumes project forward and one backward. It feeds on the apple and some shade trees. The *pupa* has two forms: that of the male, small and pointed; that of the female, larger, and usually near the eggs. The *imago* differs very much in the sexes: the female is wingless, while the male has wings of an ashen-grey color. A small black spot occurs on the outer edge, near the tip, and a small moon-shaped marking near the outer hind angle. The wings, spread, measure one and a quarter inches. The female, shortly after emerging from the pupa, lays her eggs on or near the old cocoon. Remedies: (1) Collect the eggs and destroy them. They can be readily seen when the leaves are off the trees. (2) Paris green, sprayed. (3) Bands of adhesive material painted on the trunks of the trees will prevent the wingless females from ascending to deposit eggs.

Codling Moth (*Carpocapsa pomonella*). The eggs are laid on the calyx of the young apple, while it is turned up. The *larva* is half an inch long, and burrows its way into the apple, where it feeds till fully developed, then crawls out to enter the *pupa* condition, which lasts two weeks. Affected apples fall to the ground, and often contain the worm in them, but it generally leaves the apple before this. The cocoons are frequently under the bark, and other sheltered spots. The writer has found as many as 118 under a band of tow placed around the trunk of the trees to catch the larvae after leaving the apples. The *imago* is a tiny moth, the front wings ashen-grey, the hind ones light, with a satin lustre. Though there must be many, still they are seldom seen. It appears about the time the trees are in bloom, and is one of the worst pests that attack the apple. Remedies: (1) Feed to hogs the fallen apples, which may contain the larvæ; (2) trap the larvae crawling up and down the trunk by hands or rough cloth, or tow, under which they crawl and spin

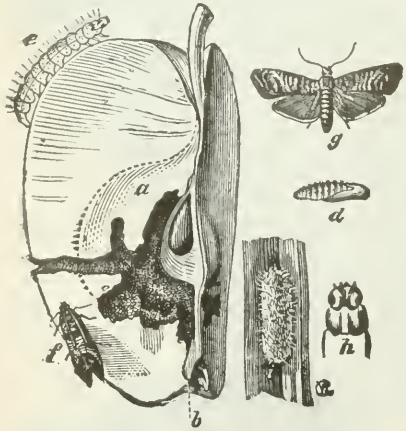


Fig. 47.—Codling Moth.

their cocoons; (3) Paris green sprayed; first application, as soon as the blossoms fall; second, eight to twelve days after; third, when the fruit is from one-quarter to one-half inch in diameter.

Cabbage Worm (*Pieris rapæ*). The eggs are laid upon the leaves. The *larva* is an inch and one half long; it is greenish, with a light yellow line down the back and along each side. It matures in two weeks, and there are several generations in a season.

Fig. 48.—Male.

Fig. 49.—Female.

Fig. 50.—(*a*) larva and (*b*) chrysalis.

The *pupa* is naked, and usually under fence-boards, and in sheltered places, near where the caterpillar has been feeding. It is angular and has a silken thread around the middle, suspending it. This condition continues about ten days. The *imago* is a common white butterfly, found flying about gardens. It has a few black markings. The female has two spots near the middle of each front wing, while the male has only one. The wings, expanded, measure two inches across. Remedies: No insect has had more remedies published for its destruction than this. (1) Pyrethrum powder mixed with six to eight parts flour and dusted upon the plants, is one of the best. Some use it in solution: one ounce pyrethrum to three gallons of water; (2) water 130° F. applied, will kill the worms and not injure the cabbage plants; (3) Paris green on young plants; (4) kerosene emulsion until the plants are heading.

Cankerworm (*Anisopteryx vernata*) This insect attacks the apple, plum, cherry and basswood, but is usually found on the apple. There are two species: One, the above, appearing in spring, is known as the "spring cankerworm," and one, in the fall, as

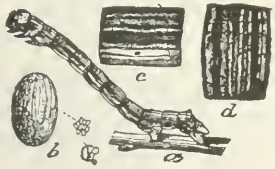


Fig. 51.

Fig 52.

"fall cankerworm." The eggs are laid in irregular masses, upon the twigs. The *larva* varies much in color in each species, from a greenish yellow to a dark brown. It is slender, an inch long, and moves with a hook-like motion, hence the term, "measuring worm" is sometimes used. Having fully developed, it passes to the ground where it enters the *pupa* stage. It can drop from the trees by a silken thread. The *imago* appears in spring. The female is without wings. The male is ash-colored and has wings. *A pometaria* is much the same as the preceding, but the imago appears in the fall. The wingless females in both species crawl up the trunks to lay their eggs on the twigs Remedies: (1) Use means to trap the climbing females. This may be done by putting a band of some material smeared with tar around the tree, or using what are known as "tree protectors," a sort of funnel-shaped structure that is fastened around the tree three or four feet from the ground; these prevent the females from getting up the trees. (2) Paris green will destroy the larvæ feeding upon the foliage.

Army Worm (*Leucania unipuncta*) The eggs are laid at the roots of grass, usually in low-lying spots. The *larva* is a general feeder upon wheat, grass, oats, etc. They

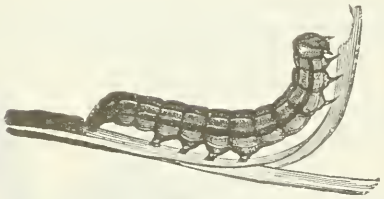


Fig. 53. — Army Worm. — Fig. 54.

frequently move in great numbers devouring everything green on the line of march. They are particularly fond of oats and care very little for plants not in the order *gramineæ* (grass family). It is one and a-quarter inches long, with three narrow yellowish stripes along the back, and develops in four weeks. The *pupa* is in the ground, but sometimes on the surface. This condition ends in two weeks. The *imago* is a gray-colored moth, with a small white spot near the centre of the front wings, which measures one and three-quarter inches across. It may pass the winter in the half grown caterpillar, or larval condition, or as a moth. During the summer of 1894 they were plentiful in several parts of Ontario. In 1896 they were very plentiful. Remedies: (1) Spray the edge of the field, where it may be safely done, with Paris green, as the "army" of worms advances to feed upon it. (2) Plow a furrow between the field and the approaching worms, and have the perpendicular side next the crop. As the worms advance they cannot get over the furrow for a time, and may be killed by thousands while in it. (3) Form windrows of straw, and as the worms get into them set fire to the straw. (4) Burn over pastures and meadows in the spring and fall. As the insect breeds largely in rank grass (such as is seen bordering swamps) these can be burned. (5) Windrows of fresh cut green oats sprinkled with Paris green (one pound in 75 gallons of water) will attract many and destroy them while feeding upon it.

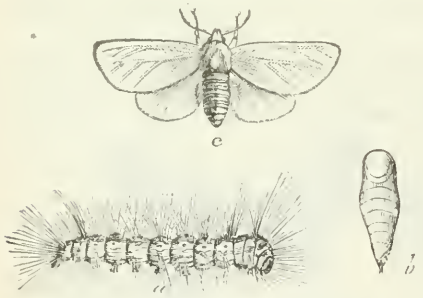


Fig. 5 —Fall Webworm.

Fall Webworm (*Hyphantria cunea*). The eggs are laid in patches on the under side of leaves, near the end of a branch. The larvæ spin a web over them as they feed, covering themselves and the leaves they are feeding upon. This is sometimes quite large, and is readily seen towards the close of summer. The *larva*, when developed, is an inch long, the body thickly covered with yellowish hairs in tufts. It feeds on the cherry, apple, and pear. The *pupa* is in the ground, or beneath something on the surface. The *imago* is a pure white moth, measuring a little over an inch across its expanded wings. Remedies: (1) Cut off the web and destroy the caterpillars. (2) Spray with Paris green.

Peach Borer (*Sannina exitiosa*). The eggs are laid on the bark or in crevices on the surface of the ground. The *larva*, a whitish caterpillar with sixteen legs, bores into the larger roots; a few hairs on tubercles are scattered over the body. The *pupa* is in the tree, within a rudely constructed cocoon. The *imago* is a small moth, with transparent wings and wasp like body. Remedies: (1) Cut out the borers in fall or spring. Their location may be seen by removing some of the earth from the base of the tree. (2) Remove the earth and apply boiling water. (3) Mound up the trees

Fig. 56.—Peach Borer.

(one foot) late in spring, and remove the soil in September. (4) One bushel of lime, one bushel of ashes, and one pint of crude carbolic acid, with thirty gallons of water, make an excellent mixture to apply upon the trees. In using this, remove the earth and apply it for about two feet up the trunk in the end of May or the beginning of June. *Æjeria rubi* is a moth which bears close resemblance to the preceding; it affects the canes of the raspberry by depositing its eggs in them just above the ground. These give rise to borers, which are sometimes very injurious. About the only treatment for this is to cut out the "borer," or pull up and burn the attacked canes.

Fig. 57. The Yellow-necked Caterpillar, *a*; its parent, *Datana ministra*, at *b*; eggs, natural sized and enlarged at *c* and *d*.

Yellow necked Caterpillar (*Datana ministra*). The *larva* of this insect usually appears upon apple trees in the early part of the summer. They feed together in considerable numbers, and when disturbed or at rest they assume a peculiar position—something of an imploring attitude. They are striped along the body. The *imago* is a moth with light brown wings, striped across with a brown of a darker shade. It measures two inches across the expanded wings. Remedies: (1) Cut off twigs containing a crowd of larvæ and destroy them. (2) Spray with Paris green.

Red-Humped Caterpillar (*Oedemasia concinna*). The larvæ of this moth is found on the plum, cherry, apple, and pear, and sometimes does considerable damage. The *larva*, an inch long, is easily identified: the head and a hump on the fourth segment are red; narrow black, yellow and white lines extend all along the body; two rows of black prickles

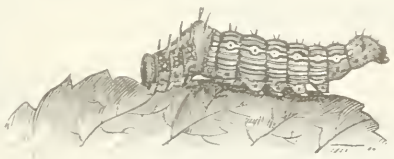


Fig. 58.—Red-humped Caterpillar.—Fig. 59.

along the back, and shorter ones along the sides. The *pupa* is in the ground or beneath leaves. The *imago* is a moth, with front wings of a brown color on the inner margin and grayish on the outer, with a dot near the middle, and a spot near each angle of the hind wings. Remedy: Spray with Paris green.

Bud Moth (*Tmetocera ocellana*). (Fig. 60.) This insect is found attacking the buds upon the apple, and sometimes proves very injurious. The half-grown *larva* winters over, and appears in spring as a small brown caterpillar, just about the time the buds begin to open, and feeds upon them. It measures about half an inch when full-grown. By rolling up one side of a leaf, and securely fastening it with silken threads, it forms a tube, in which it enters the *pupa* stage, having lined the little chamber with a close woven layer of silk. This condition lasts ten days. The *imago* is a small moth, resembling the codling moth in size and form. It is of an ash gray color. The front wings have a whitish gray band across the middle; the hind wings are of a dusty brown. The expanded wings measure half an inch across. Remedy: Spray Paris green (one pound to two hundred and fifty gallons of water) just as the buds are opening, and again in seven to ten days, or before the blossoms open.

Fig. 60.

Clothes Moth (*Tinea pellionella*). This moth (Fig. 61) usually appears about June, flitting about in the evening, avoiding the light and seeking the darker parts of the rooms. The eggs are laid, and soon after larvæ from them appear and feed upon all kinds of woolen material, furs, carpets, etc. The *larva* constructs a case for itself out of the materials upon which it feeds. This is enlarged as the occupant grows. It passes the *pupa* stage in the case, and finally emerges as an *imago*—a small moth about one half an inch across the wings. The fore wings are dark gray, while the hind are a silky gray and lighter than the fore wings. Remedy: Articles in daily use, and rooms frequently aired and swept, are not apt to be seriously affected. Beating, shaking or brushing, and exposure to air and sunshine are good remedies. Tobacco, camphor, moth balls, cedar chips, etc., have a tendency to repel this insect, if the materials are not already stocked with eggs or larvæ. They are not likely to deposit eggs near where such odors prevail. When putting away furs, etc., after beating and exposing to sunlight, they should be enclosed in boxes, paper bags, etc., into which the insects cannot get to deposit their eggs. If moth-balls, etc., are put in the boxes, they will aid in repelling the insects. Care should be taken that the articles are not infested before being put in. If the boxes are lined with tar paper it will improve them. Cloth-covered furniture and cloth-lined carriages may be sprayed with benzine about April, June, and August. It must be remembered that this is very inflammable and fire should not be near when it is used. A solution of corrosive sublimate in alcohol may be applied with a sponge and prove very successful. This compound is very poisonous and must be carefully used. Wherever benzine can be applied it is good for getting rid of this pest, as it kills the insects and destroys the eggs.

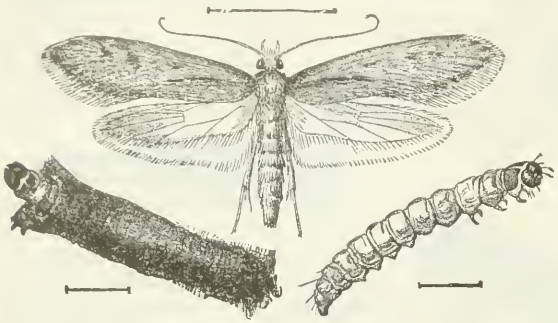


Fig. 61.—Clothes Moth.

Injurious Insects in the Order Hemiptera.

This order embraces insects as the plant-lice and bugs. Most of the injurious insects of this division live on the juice of plants upon which they feed. They may be destroyed by kerosene emulsion. The insects in this group do not pass through a series of well-marked changes from the young to the adult form.

Fig 62

The Squash Bug (*Anasa tristis*). The *larva* resembles the *imago*, except in size. The adult insect is a rusty black, flat bug, yellow on the under side, half an inch long, and has a musty odor. It winters in the adult form, underneath leaves, boards, etc. The eggs are laid on the under sides of the leaves, in June. They soon hatch out the young bugs. Remedies: (1) Handpicking, morning and evening, when they are less active. (2) Kerosene emulsion, diluted with twelve parts of water, is effective. (3) Small boards placed in the vicinity of the plants become hiding places for them, and serve as traps beneath which many can be destroyed.

Aphidæ (*Plant-lice*). (Figs. 63 and 64.) These minute greenish insects affect the foliage of nearly all plants. They present a strange peculiarity in their life history. Those that appear in spring are females, and generation after generation they produce living young, all females, until the close of summer, when males appear in the *last* generation. Eggs are now laid, and the following spring females appear to again produce living young for several generations. Many species of them secrete a sweet substance, of which ants are very fond—so much so that they search for plant-lice in order to get it on the leaves near the lice. Ants are said to even carry the Aphidæ to their nests, and keep them there to supply the sweet liquid, and thus have them as we keep cows to supply milk. *Aphis mali*

affects the apple. Remedy: Kerosene emulsion, diluted with ten parts water, sprayed, will destroy them. Plant-lice are often very troublesome in greenhouses, and are usually treated with tobacco smoke. Tobacco stems are put in a vessel and burned; the closed greenhouse becomes filled with the smoke, which kills the lice. Solution is another form in which tobacco is used to kill plant-lice; it is made by putting one pound of tobacco

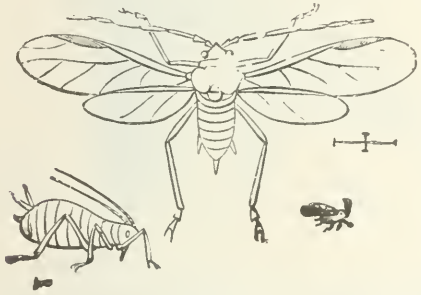


Fig 63

Fig 64

stems, leaves or dust, into two or three gallons of water, and boiling it for about twenty minutes; as soon as cold, it is fit for use, and can be sprayed upon the plants with good effect. *A brassicæ* appears on the cabbage; *Myzus ribis*, on the currant; *A. maidis* on corn; *Myzus cerasi* on the cherry; *M. persicæ* on the peach; *A. prunifolii* on the plum; *Siphonophora avenæ* on wheat and oats. These are all members of the family *Aphididæ*, and where practicable, are destroyed by kerosene emulsion, diluted with ten to fifteen parts water, or tobacco, in solution or as smoke.

Oyster-Shell Bark-louse (*Mylilaspis pomorum*).

Fig 65

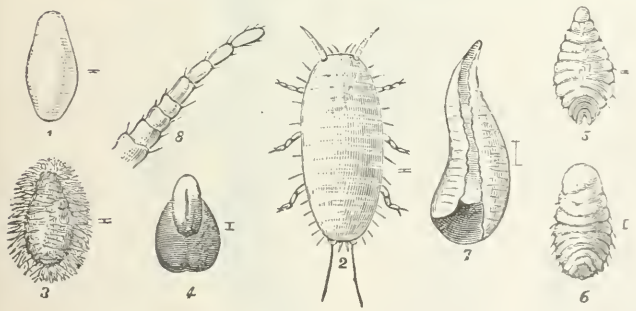


Fig 66

The eggs are beneath the oyster-shell shaped scale (one-sixth of an inch) upon the twigs and other parts of the tree, and are of much the same color as the young bark. They hatch in the end of May or the beginning of June. The *larvæ* are very minute, almost invisible, and appear as small specks moving on the twigs of the apple tree. As soon as hatched, they seek the ends of the young twigs where they become fixed, and continue to suck the juice from the twigs. Soon a scale forms over them, by a substance issuing from their bodies in the form of waxy threads. All under the scales, the shape of an oyster-shell, are females that deposit their eggs under the scale. The scale covering a male is more oblong, and is very rarely seen. Remedy: In winter or early spring, scrape off the rough bark from the trunk and large limbs and rub in with a scrubbing-brush the following solution:—One quart soft soap, or one-quarter pound hard, in two quarts boiling water; take seven parts of this and and add one part carbolic acid; then when the young lice are moving (May or June) spray with kerosene emulsion, diluted with ten parts water.

Lice (*Hæmatopinus*). Our domestic animals are often infested with lice. There are two types, one suck, the other bite, each belonging to a different order of insects ; the

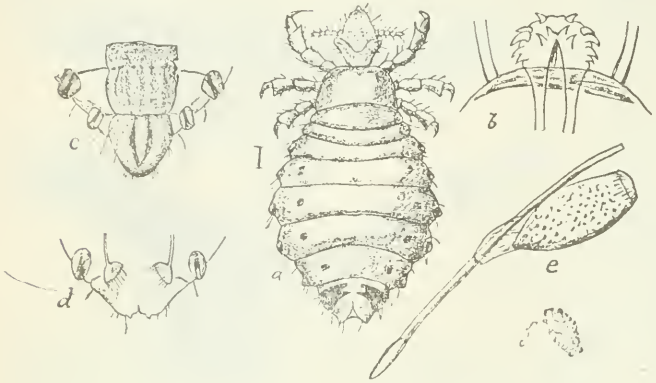


Fig. 67. Short nose ox louse.

Hæmatopinus eurysternus : *a*, female ; *b*, rostrum ; *c*, ventral surface of the last segments of male ; *e*, egg ; *f*, surface of same greatly enlarged.

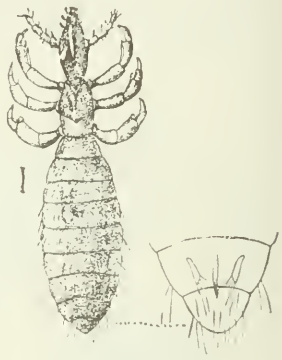


Fig. 68. Long nose ox louse.

Hæmatopinus vituli : female, under surface of last segments of abdomen of same, showing brush-like organs—enlarged.

first belong to the Hemiptera ; the second to the Neuroptera, or Mallophaga, one of the orders into which the Neuroptera has been divided. The first are what we will now consider. They live upon animals by sucking their blood. The eggs are stuck to the hairs, and soon hatch ; the young lice resemble the adults but are smaller. The following are the common species (all belonging to the same genus) :—*Hæmatopinus eurystinus*,

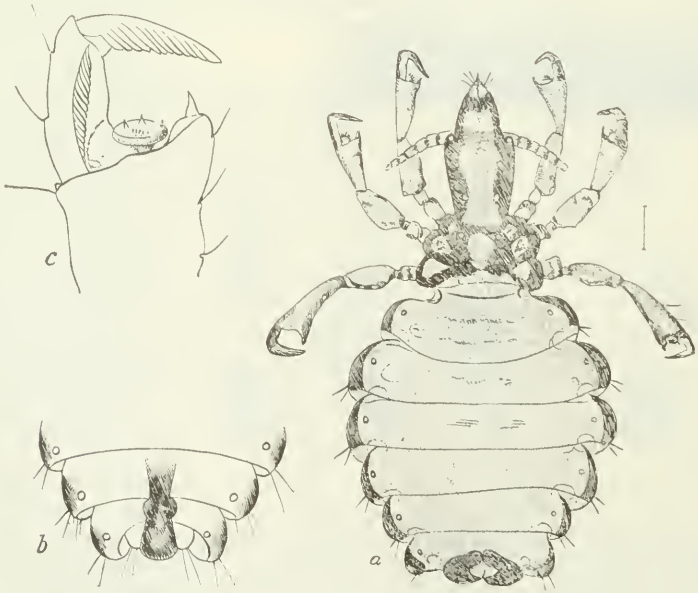


Fig. 70. Pig louse.

Hæmatopinus urius: *a*, female ; *b*, ventral view of posterior segments of male ; *c*, leg, showing protractile disk of tibia—enlarged.

short nosed ox-louse (Fig 67); *H. vituli*, long-nosed ox-louse (Fig 68); *H. asini*, horse-louse (Fig 69); *H. suis*, pig louse (Fig 70); *H. piliferus*, dog-louse (Fig 71). Remedies:

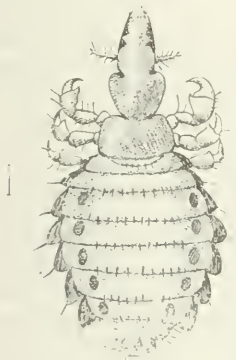
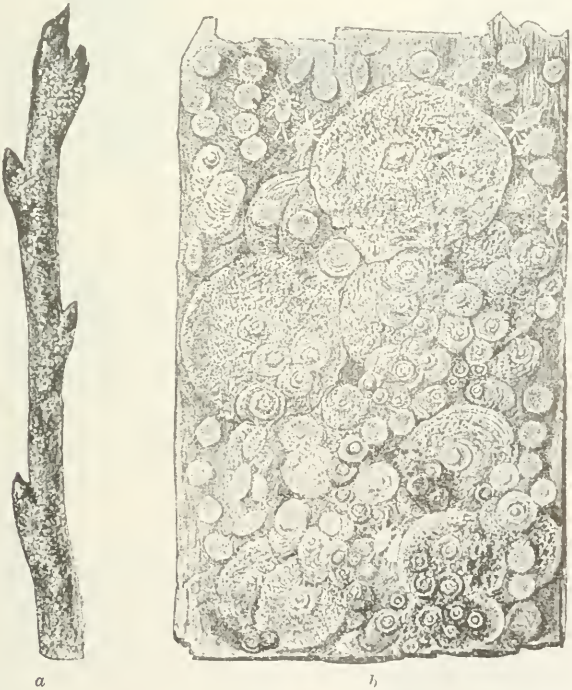


FIG. 69. Horse louse.

FIG. 71. Dog louse.

(1) Kerosene emulsion, ten to twelve parts water. (2) Rub with an ointment, three parts lard, one part coal oil. (2) Tobacco solution, one pound boiled in two gallons water.

SAN JOSE SCALE (*Aspidiotus perniciosus*). This insect is attracting considerable attention at the present time. At first it was confined to California, but has now reached



a *b*

FIG. 72. SAN JOSE SCALE.

Appearance of scale on bark; *a*, infested twig—natural size; *b*, bark as it appears under hand lens, showing scales in various stages of development and young larvæ.

the northern States, and may be expected in Ontario before long. It has also appeared in British Columbia. It attacks most fruit trees, and also currants. The scale is round,

flat, and pressed close to the bark, which it resembles in color. It is very small (one-eighth of an inch in diameter.) About the middle is a small round black point. This may appear yellowish. Sometimes the scales are very numerous, and overlap. The insects are half-grown in winter, but remain under the scales till shortly after the trees leaf out. Remedies: About May-June spray with kerosene emulsion; dilute with nine parts water for apple trees; peach, fifteen. Make three applications, at intervals of ten days. In winter an application may be made with stronger emulsion, diluted with four parts water.

Plum Scale (*Lecanium*).—The brown scale of this insect, when fully developed, is much larger than any of the previously described, being the fifth of an inch in diameter. The small scales move about the beginning of April, making their way to the under side of the limbs. Here they remain and mature, growing very rapidly, until full development is attained at the end of May, when they begin to lay eggs under the scale. The matured scales are oval in the females which last but a short time. The young insects appear about the first of July, proceed to the leaves, and locate themselves on the under side to feed by sucking the juice. From this they emigrate about September, to the under side of the branches, and hibernate, as small scales, less than the size of a pin-head, their growth being comparatively little during the summer. Remedy: Kerosene emulsion applied as follows:—(1) Beginning of July, kerosene emulsion diluted, six to eight parts water. (2) October. the same, but diluted only four parts water. (3) Some time in the winter, the same as No. 2, (4) About the beginning of April, the same as No. 2

Injurious Insects in the Order Diptera.

In this order the insects have only two wings—the hind pairs are lacking. Some small forms are very troublesome to field crops.

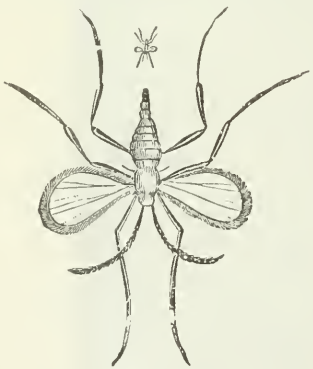


Fig. 73.

Fig 74.

Wheat Midge. (*Diplosis Tritici*).—The eggs are deposited between the chaff of the wheat-heads during warm damp evenings, and in the shade about the middle of June. The *larva* is very small (one-eighth of an inch long) of an orange color, and feeds on the young kernel. Moisture is very favourable to its development, but it can remain for months in a dormant state, if the conditions are not suitable, and then become active when they are. It remains in the head till the stalk is wet and then passes to the ground where it enters the *pupa* stage. The *imago* is a very small fly (one-tenth of an inch long) yellowish body, with two clear glossy wings. Remedies. (1) Sow early-maturing wheat, as the midge is less liable to attack it. (2) Ploughing deep in the fall buries many larvæ and pupæ. (3) Screenings often contain pupæ, which may be readily destroyed. (4) Sow midge-proof wheat.

Hessian Fly. (*Cecidomyia destructor*).—This is another insect which attacks the wheat. Fall wheat is very favourable for its development. The eggs are laid on the upper surface of the fall wheat blades. As soon as the *larvæ* hatch they descend to the base of the sheath, where they become imbedded in the stalk. They take about three weeks to develop, and then become *pupæ*, which resemble a flax-seed. The winter is usually spent in this condition. In spring the *imago* appears and lays eggs for another brood. The second brood is found higher up on the stem, at the first or second joints from the root. The imago is a minute, two-winged fly, with a dark-brown body and dull, smoky-brown wings. Remedies: (1) Sow fall wheat as late as possible. (2) Burning the stubble of wheat fields may destroy many in the flax-seed condition. (3) Sow some wheat in the field early, so as to attract the fly, and after a time when the eggs are deposited, plow this under and sow the regular crop. (4) Burn any refuse which may contain the pupæ ("flax-seed").

Fig 75.

Horn-Fly. (*Hæmatobia serrata*).—The eggs are laid on the surface of the dung of cattle, and from these the *larvæ* are hatched, which, when mature, enter the ground to assume the *pupa* condition for a few days. The *imago* is a small fly, resembling the house fly, but very much smaller. These flies settle at the base of the horn, so as to be beyond the reach of the animal. By inserting their beaks into the skin and sucking the blood from the wound, they irritate the cattle, and are especially troublesome to milch cows. More injury is sustained from rubbing by the cattle than from the bites of the fly. They take only three weeks to complete their life history, and consequently there are several broods in the season. They first appeared in Canada in 1892. Remedies: (1) Rub points attacked with fish-oil, to which a little carbolic acid has been added. (2) Apply kerosene emulsion diluted with twelve parts water. A better emulsion is made by substituting fish-oil for kerosene. (3) Tobacco dust will also keep off the insects by dusting it upon the tail, back, and neck of the animal, and upon the base of the horns.

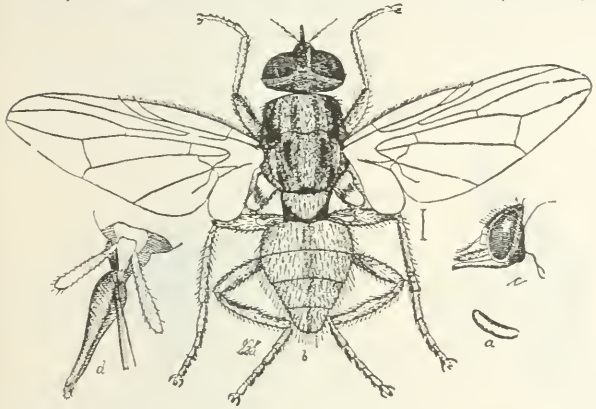


Fig. 76.—Horn Fly.
Hæmatobi serrata.—*a*, egg; *b*, fly; *c* and *d*, head and mouth all enlarged.

Cabbage Maggot (*Phorbia brassicæ*). This small, slender fly, resembling the house-fly, lays its eggs near the crown of the root. These give rise to small worms that bore into the root and feed upon its substance. The *pupæ* are in the ground, and are brown egg-like bodies. Remedies: (1) When putting out the plants, a teaspoonful of carbon bisulphide poured into a hole, near the plant, will prevent the fly depositing its

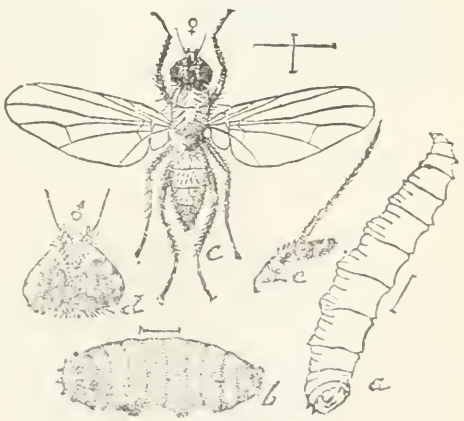


Fig. 77.—Cabbage Maggot.
Phorbia brassicæ.—*a*, larva; *b*, pupa; *c*, adult; *d*, its head; *e*, antenna.

eggs. (2) Apply kerosene emulsion about the roots. (3) Coal oil, mixed with sands and then sprinkled near the plants. (4) A piece of tarred paper, three inches square, cut so as to place the plant in the centre, forms an excellent protection. This may be done by cutting a slit into the centre. Place the paper about the crown of the plant, and this will keep the fly from depositing its eggs.

Clover-Seed Midge. (*Cecidomyia leguminicola*).—This insect lays its eggs in the heads of the clover. The *larva* feeds upon the forming seed; it is of an orange color, and very small (one tenth of an inch long). The *pupa* is in the ground, or under rubbish on the surface. The *imago* is a very small fly, appearing about June and September. Remedies: (1) Stop growing clover-seed, and thus raise no second brood. (2) Pasture the clover till the beginning or middle of June, and then let it grow for seed; this avoids the first attack. (3) Cut the clover before the end of June (when the larvæ are mature and enter the ground). This will destroy the first brood, and a second will not appear. (4) Mow when the heads are green and just forming; leave this as a mulch, a new crop of blossoms will come between the regular crops and escape the midge.

Onion Fly (*Phorbia ceparum.*) Much the same as the preceding, but the eggs are laid on onion bulbs. Remedies: (1) Remove the affected onions, which can readily be recognized from their sickly, yellowish appearance. These will have worms in them which should be destroyed. (2) Sprinkle kerosene emulsion near the onions. (3) Change the onion bed each year.

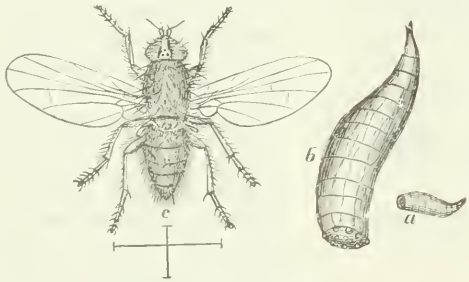


Fig. 78. Onion Fly.

Fig. 79. Horse Bot.

Horse Bot (*Gastrophilus equi*). The eggs are deposited on the front legs, etc., where the horse can lick them; each has a small lid. The *larva* is in the stomach of the horse, which it has reached by the horse licking newly-hatched larvæ from the eggs and swallowing them. It is of an ugly grub-like form, an inch long, with eleven segments. Spines on each segment enable it to keep attached to the walls of the stomach; there are also two hooks at the head. It develops in three weeks, then is passed out of the horse, and enters the *pupa* condition in the ground. The *imago* is a large coarse fly; the body of the female is wedge-shaped, while that of the male has a more rounded outline. Remedies: (1) Remove the eggs. (2) Apply carbolic acid to the parts where there are eggs.

Ox Bot (*Hypoderma lineata*). This insect causes the so-called "warbles" of cattle, or boil-like swellings on their backs, in spring and early summer. These eggs are deposited on the back, and the *larva* burrows into the skin and there produces the lumps seen upon cattle affected. These injure the hide and affect the quality of the beef. The larva is fully an inch long, and has the breathing pores located in the posterior part of the body. They are near the opening of the lump or swelling. When matured, the larva gets out of the swelling, reaches the ground, where it passes the *pupa*, and then emerges a coarse hairy fly. Remedies: (1) Press out the maggot and kill it. (2) Smearing the back with fish-oil in autumn will kill the larva, and rubbing on the same in summer keeps the fly away. Almost any greasy substance rubbed over the lumps so as to close up the openings, will kill the larvæ, by preventing them getting air.

Sheep Bot (*Cephalalæmia ovis*). The *larvæ* of this insect are in the nostrils of the sheep, and work their way into the upper part of the head, but not into the brain as is supposed by some. The *pupa* is passed in the ground, and not in the head, from

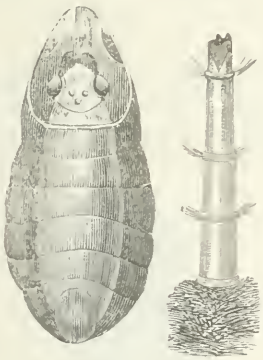


Fig. 80. Ox Bot.

Fig. 81. Sheep Bot.

which the larvæ pass when matured. The *imago* is smaller than the ox-fly. Remedies: (1) Smear the nose with tar; this keeps away the fly. (2) Larvæ in the nose may be killed by pushing up a feather, dipped in a weak solution of carbolic acid, or in turpentine.

Injurious Insects in the Order Orthoptera.

This order has comparatively few injurious insects, but those have been in some cases a great source of injury. The young are much the same as the adult, except in being wingless, and of smaller size.

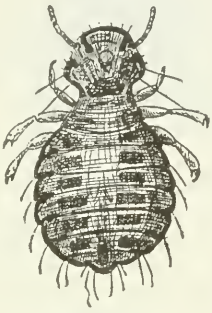
Rocky Mountain Locust (*Melanoplus spretus*). The eggs are laid in the ground, usually in such places as the roadside. The *larva* undergoes several moults before full development is reached. There appears to be seven stages in development—one in the egg, two in the larva, three in the pupa, and one in the imago. The *imago* is migratory in its habits; has long wings, and resembles our form *M. femurrubrum*, (our common red-legged grasshopper) but the latter has much shorter wings. This insect, properly speaking, is a locust, and what is usually called a locust (the green locust) is a grasshopper, but the term grasshopper has been so long in use that it is likely to be still applied in the same way. Remedies: (1) Put straw in heaps, and as the grasshoppers light upon it set fire to the straw. (2) Use a "hopper-doser." This is a pan something like a scraper, and may be of the following size, or larger: Eight feet long, one foot wide, one foot high at the back, and one inch at the front, with sloping sides. In the bottom of this is placed some tar or coal oil, and the apparatus drawn over the fields when the grasshoppers are young. They jump into it by thousands and are killed. (3) Some make a mixture by weight five parts bran; sugar, one, arsenic, one; mix the bran and arsenic first, then add the sugar dissolved. Place this in spots near where the grasshoppers are. They will feed upon it readily. Some make the poisonous mixture by mixing one hundred pounds bran, two quarts molasses, and three pounds Paris green; a little water may be added. (4) Ditches are sometimes dug so as to catch the insects, which are killed as they collect in them. (5) Harrowing in autumn, or ploughing, will expose the eggs.

Fig. 82

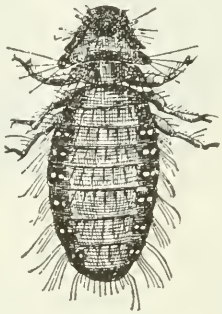
Injurious Insects in the Order Neuroptera.

This order is also one with but very few injurious insects; those that we refer to here are by some writers put into another order: Mallophaga (*mallos*, wool; *phagein*, to eat); one of the eight orders into which the Neuroptera has been divided.

Bird Lice.—There are several species of these insects that attack the domestic animals, but nearly all belong to one genus: *Trichodectes*, *T. parumpilosus*, upon the horse; *T. sphærocephalus*, on the sheep; *T. scalaris*, on cattle; *T. Latus*, on the dog; *Menopon pallidum*, on the hen. They do not feed by sucking blood, but upon wool.

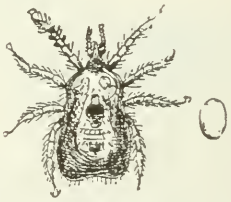


Fowl louse (*Goniocotes hologaster*) (greatly enlarged).



Fowl louse (*Menopon pallidium*) (greatly enlarged.)

Fowl louse (*Lipeurus variabilis*) (greatly enlarged).



Dermanyssus gallinæ and ovum (greatly enlarged).

feathers, epidermal scales, etc., and have strong biting jaws. They are peculiar to birds, and hence spoken of as "bird-lice." They lay their eggs on the hair, etc. Remedies: (1) The same as those given for lice, and the following: Four ounces staves-acre (powdered), four ounces soft soap, one ounce carbolic acid, one gallon water, boiled half an hour, and applied weekly, is recommended by some as effectual. (2) One pound of lard, mixed with two ounces powdered sulphur, then add quarter pint of kerosene, is reported good to rub on poultry. (3) Dust pyrethrum powder upon the infested parts of hens, and rub from time to time their perches with coal oil.

FISH DEPARTMENT.

FISH CULTURE IN ONTARIO.

By Dr. G. A. MacCallum, Chairman Ontario Game and Fish Commission.

In a country like Canada the three great original industries are those belonging to agriculture, mining, and the fisheries, or the work connected with the products of the surface of the earth, the interior of the earth and of its waters. These industries are all more or less under the control of the government of the country, and should be administered in the best interests of the people, and each successive government does claim that its efforts are always in that direction. But is this always the case? Do legislatures always, in dealing with any of these great industries, endeavor, by previous scientific enquiry and research, to find out the proper lines to follow so as to bring about the best results? It may be taken for granted at this age that science in the future must regulate the material interests of mankind. It has already produced great industrial and economic revolutions, and no doubt many more are to follow. Therefore, it may be said without fear of contradiction that the legislature of any country is wisest which in all its investigations preparatory to legislation takes care to make or have made a thoroughly scientific report of the problem being considered before laws are enacted concerning it. It is not always necessary that, with reference to some of these questions, the investigator shall be a deeply learned scientist, for any man who, by correct and careful observation, draws correct conclusions regarding a question, as proved by results, must be regarded as, to some extent, a man of science. Some of the greatest scientific economic problems have been solved, not by men of great learning but by accurate observers of nature. When these great discoveries come to be criticised by learned scientific men, it is found that all the facts may be accounted for by scientific reasons. It may be that it has required several observers of different facts connected with the same subject, even several generations of observers all recording these facts, and it may be that nothing of great economic value resulted until some accurate student and observer brings all these facts to bear upon a certain problem and then it is that a great discovery is made and the observer announced and accepted by the world as a great scientist. Observers, to a greater or less extent, are among us in the every day walks of life, and the man who brings the most accurate observation and reasoning to bear upon his work is the man who will succeed best in that work. The farmer who is most careful and observing himself and takes advantage of the recorded observation of others, whether scientific or practical, will succeed the best in his operations, for he draws his conclusions from the results of his own observations and those of others, and thus becomes to a greater or less extent a scientific farmer. The one who follows all the old prejudices, traditions and false opinions of his predecessors will surely succeed less than he who eliminates them and studies the latest and matured opinions of those who have scientifically studied the question, and shown by the beneficial results obtained that those opinions are right and in accordance with the true principles of nature.

Of the many magnificent heritages with which Canada has been so abundantly blessed not the least is that of her fisheries, in extent, perhaps, one of the greatest in the world. Of her fresh water fisheries those of Ontario exceed those of any other province, and indeed at one time no expanse of fresh water in the known world could compare with that of Lake Erie in the productiveness of its fisheries. The lake at that time literally swarmed with fish, notably white fish and herrings, and to a somewhat less extent the same could be said of the other waters which lave Ontario's shores as well as her inland waters, but that age of bounteous plenty is a thing of the past. As long as nature was allowed to maintain the balance of existence all was well, but when civilized man entered the arena with his cunningly devised schemes of destruction it became only a matter of time when the fisheries would be ruined. Thus, although pound and gill nets have been

in use for only a few years some of the great lakes are already almost depleted of fish, at all events from a commercial point of view. One fisherman, in giving evidence before the Dominion Fishery Commission in 1893, said that thirty years ago he had known as many as 90,000 white fish taken in one haul in the night at Wellington Beach, Lake Ontario; that he had taken 40,000 several times in a seine, in July, at the same place. Now in that lake the white fish fishery has ceased to exist. The same mode of fishing is now being carried on in the other lakes, Georgian Bay, etc., and it is only a matter of a few years when the fisheries there, too, will cease because they have become unprofitable, but as long as there is any money in it just so long will hundreds of miles of gill nets be allowed to be set on and around the spawning beds of the fish so that those which are not caught will be prevented from reaching their natural spawning grounds.

Trap-nets and pound-nets are also destructive engines; in other words, the fisheries are being over-fished and immature fish taken before they have been allowed to spawn. It is true that our Government spends liberally in the matter of fish culture and planting, but nothing can compensate for taking the fish in the extravagant and wasteful manner which has been pursued heretofore. Ontario, as the premier Province in the Confederation, should set an example to the rest of the Dominion in the intelligent husbanding of her fisheries and in the scientific attempts to restore them to their former condition. Our inland lakes, rivers and creeks, once teeming with luscious trout, bass and other varieties, are now for the most part barren—all caused, as the Dominion Commission of 1893 conclude, by the following: (1) "Fishing in the spawning seasons and while fish are congregating for that purpose, going to and returning to the shores, bars, bays, reefs and rivers which are their breeding haunts. (2) The great destruction of immature fish in pound and gill-nets and seines. (3) The waste of great quantities of fish in the use of unlimited lengths of gill-nets. (4) The use of too small meshes in all nets. (5) The great deposits of refuse matter from saw-mills and from the towage of immense rafts of saw-logs across the fishing grounds into the United States. These causes, each and combined, are in direct violation of Nature's laws in not giving to all fish full freedom to replenish the waters at their spawning seasons, and killing them before reaching maturity for reproduction purposes." Mr. Samuel Wilmott, perhaps the best Canadian authority on fishery questions, was Chairman of the above Commission, which gives weight to such conclusions. However, in the case of our rivers and streams, beside over-fishing might be added the fact that in many cases obstructions in the form of dams, etc., prevent the fish from reaching their natural spawning places, and after a few attempts they abandon such streams.

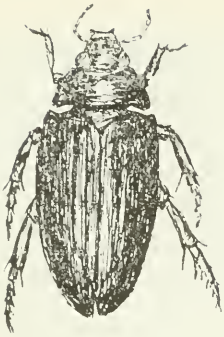
The condition of our fisheries in the great lakes and their restoration is greatly complicated by the fact that they are in international waters; that on the American side of the international line the fisheries are even in a very much worse condition than on our own, owing chiefly to over-fishing and the non-observance of any close season in which to allow the fish to spawn. Now the great question for both countries to consider is how to prevent the total annihilation of their fisheries. The United States are making desperate, yet praiseworthy, efforts to that end by fish culture and planting, but so far they stupidly ignore the necessity for a close season in which to favor Nature's great means of reproduction. This condition of things is not because the best informed authorities upon this subject are not in favor of protecting the fish during the spawning season, but because large moneyed interests prevent it by their influence in a political way. In our own country, too, although such political interests have not been able to abolish the close season, yet licenses to fish with gill and pound-nets have been given to everyone who asked for them and paid the paltry license fee even to set them in our rivers and streams, where they mean total annihilation.

If the control of the fisheries of Canada pass into the hands of the different provinces, as is expected, let us hope that a new era will dawn and a different policy be instituted. In Ontario thus far our fisheries have not received such close attention as they require in order to prevent their premature failure. This is partly owing to the fact that they are under the Federal Government and did not receive that special and jealous care which they would if under the supervision of the Province. The Province has a Game and Fish Commission which has done much good work in protecting and preserving the game, but

except in looking after the fisheries of the Crown Land waters, it has not done much with the other fisheries, on account of the disputed jurisdiction ; but if the decision of the Privy Council should be in favor of the provinces the people should ask that the government take up a vigorous policy with reference to her fisheries and see that the duty of the Commission to increase the quantity and improve the quality of the fish of the Province be attended to. That this may be done in a proper and up-to-date manner, a Commissioner should be appointed on the Board, who, by education and training, will be able to investigate scientifically the cause of the decrease of the fish and devise means for their restoration. He should be able to study the natural history of the fishes, to determine what are the most favorable conditions under which each variety thrives in its natural state—be able to examine the water and all of its inhabitants, whether vegetable or animal—survey the waters, study the bottom physically and biologically, also the surroundings, and determine how much value these facts have upon the life history of the fish. As will be readily seen this involves a series of difficult investigations and yet they are absolutely necessary in deciding intelligently with what fish to stock a certain water in order to farm it to its fullest capacity and to the best advantage. A farmer studies somewhat similar questions, takes them all into consideration, even if sometimes involuntarily, before he decides with what grain a certain field shall be sown. In the future scientific water-farming will be one of the industries by which our great stretches of water will be made to yield their fair share of good and wholesome food for the nation. Heretofore a great deal of harm has sometimes been done certain waters by guessing at the sort of fish to plant therein ; they have either not succeeded, or they have proved destructive to the valuable food fishes already inhabiting the water, much as if a farmer sowed thistle or other weed seeds among his crops.

For several years agricultural pursuits have been followed with less profit than formerly, and although an economic and scientific mode of farming has been followed, yet the result has not been altogether satisfactory, and farmers have looked about for new devices by which to augment their incomes and make their lands more productive and the lives of their families more comfortable. There is, however, one branch of economic and successful farming to which they have not to any extent applied themselves, and this is water-farming. Few farms are without ponds of water or sites for ponds, such as marshy tracts, which could be formed into sheets of water, or where by judicious damning across a ravine, etc., the landscape could not only be vastly improved in appearance, but such spots could be very easily made to yield a greater revenue than if farmed in the old way by ditching and cultivation. Besides all this, it is questionable if it be judicious at all times to drain all the moisture from a farm. In seasons of drought, which come so often now, since the land is cleared up to such a great extent, and the rainfalls and melting snows are run off so quickly by artificial drainage, it is certain that those lands will not yield so abundantly as if they had continuously more moisture. It would probably be far better to husband the water in the form of ponds, construct them properly and make them as deep as possible—a common rule being that for successful fish culture, one-third of the area covered by water should be from two to eight feet deep, and the balance of the area spreading out to a few inches to the margin Then if there is not sufficient water to supply it have an artesian well and windmill ; these would supply the watering trough for the cattle of the farm, and the overflow running into the pond will keep it at the proper level. Now this body of water can be farmed by planting fish in it and, if intelligently conducted, two harvests can be reaped from it—one in the spring and the other in the autumn ; besides it will be a constant source of pleasure, affording in the summer an enjoyable place for boating and bathing, and in winter for skating as well as for furnishing ice for use during the succeeding summer.

Such a pond, properly made and under control, will add immensely to the appearance and value of the farm. As an article of diet none can be more wholesome than fish, especially to the farmer whose diet is necessarily made up of salted meats for the greater part of the year. From such a pond as described a fish can be taken at almost any time and will make a pleasant change of diet which is so essential to healthy digestion. We would advise that, although our waters afford several fish which could be farmed with profit, yet perhaps the easiest managed fish for a beginner is the carp. It is not a first-



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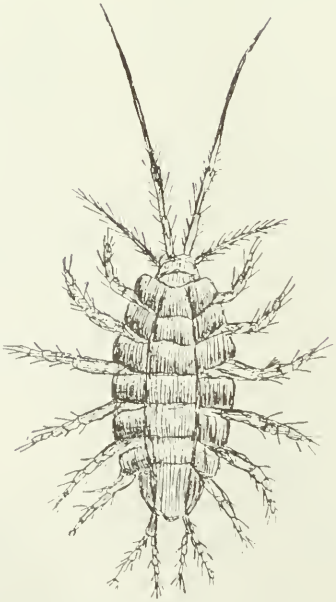

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PLATE I.

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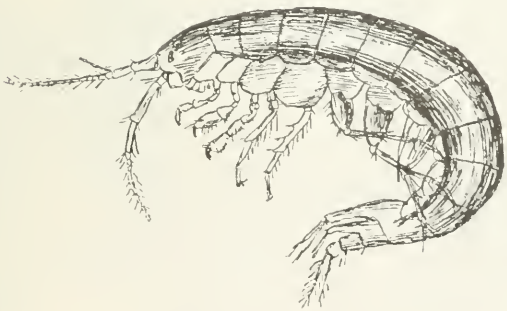

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PLATE II.
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class fish, and yet it suits the tastes of the great majority of people. It will thrive in almost any water, but of course its environments largely determine its quality, for you would not expect to be able to take a well flavored fish from a mudhole, and yet the carp would live there. There is no reason whatever why almost every farmer should not have his carp pen or pond as well as his pig pen. What little knowledge is necessary for its cultivation can be acquired in a short time by almost anyone. There is probably more literature referring to the culture of the carp than any other fish, for it has been domesticated since the early ages. It is spoken of by Aristotle 350 years before Christ. It is not certain when it was first introduced into Europe, but in Austria it has been cultivated for many hundreds of years, and to-day that country has the largest carp ponds in the world. One series of ponds, owned by an Austrian Prince, covers about 20,000 acres and yields to its owner a large annual revenue, as these fish form the chief fish food of the people of the country. It was introduced into America in 1872 by Mr. Poppe of California, who brought over five small ones and placed them in a pond prepared for them. These did well as did those brought out in 1877 by Mr. R. Hessel, 345 in all of different varieties, and from these two lots the American waters have been pretty well stocked by this prolific and hardy fish. There are five varieties of carp—the Mirror or King carp, the naked or leather carp, the golden carp, the blue carp and the scale or noble carp.

The carp is a bottom feeder, and lives naturally on snails, maggots, worms, insects, larvæ, bugs, etc. and the tender roots of some water plants, but in confinement it will eat the refuse from breweries and distilleries, soaked wheat or corn—in fact, almost anything that a pig will eat. It grows very rapidly during the warm months of the year, and has been known to have reached a weight of six pounds in eighteen months, and in some of the warmer States even a more rapid growth. For instance, in California some carp placed in a pond containing warm springs were fed on blood, thick milk, refuse from slaughter houses, etc., and grew marvellously. When placed in the pond they measured 15 centimeters in length; after nine months they commenced to spawn, and after twelve months they measured 50 centimeters in length and weighed from 12 to 15 pounds. One can hardly credit this, but when you consider the climate there, without any winter, the twelve months there would be equal to two years in colder regions.

Ponds which have gravel or stone bottoms are not suitable for carp as they are not prolific enough of insect life, especially as the carp feeds on the bottom and, in fact, hibernates in the mud. It is the habit of the fish during the winter to collect in groups of eight or ten, and, thrusting their heads down into the mud, remain with their tails elevated at an angle of 45°. There without food or apparent life they remain until spring, and though they eat nothing during all this time they do not seem to lose much in weight during their long fast. As a food fish, in the estimate of many, the carp stands very high, but of course tastes differ. There are those who do not like oysters, frogs' legs, or even lamb, yet that does not prove that they are not delicious and wholesome food. In the cultivation of carp every farmer can raise his own fish as easily as he can raise poultry or any of the animals, and thus contribute not only to the income of the farm but also to the benefit and pleasure of himself and family.

The mistake must not be made of trying to raise carp with other fish. The pond should be kept clear of other fish, frogs, turtles, snakes, etc., which all feed upon the young fry. The pond or ponds should be made after a certain approved plan. Experienced fish culturists have found that a carp pond or series of ponds should be so designed as to give the fish the best chance not only to breed but to hibernate most successfully. If a single pond only is used, it should be so constructed that it may be emptied at pleasure without allowing the escape of the fish, and so that they can be inspected and caught for the market. Thus through the centre of the bottom of the pond should be a ditch, and if there are low places ditches should be cut so as to all converge into the central one, and the material taken from them can go to form the dam, the base of which should be three times its height. The pond should have at least one-third of its area deep and the rest shallow, so as to furnish both warm water in which plants may grow, insects breed for fish food and where the fish may spawn, and the deep water where the fish may retreat from the heat in summer and for warmth in winter. The principle of

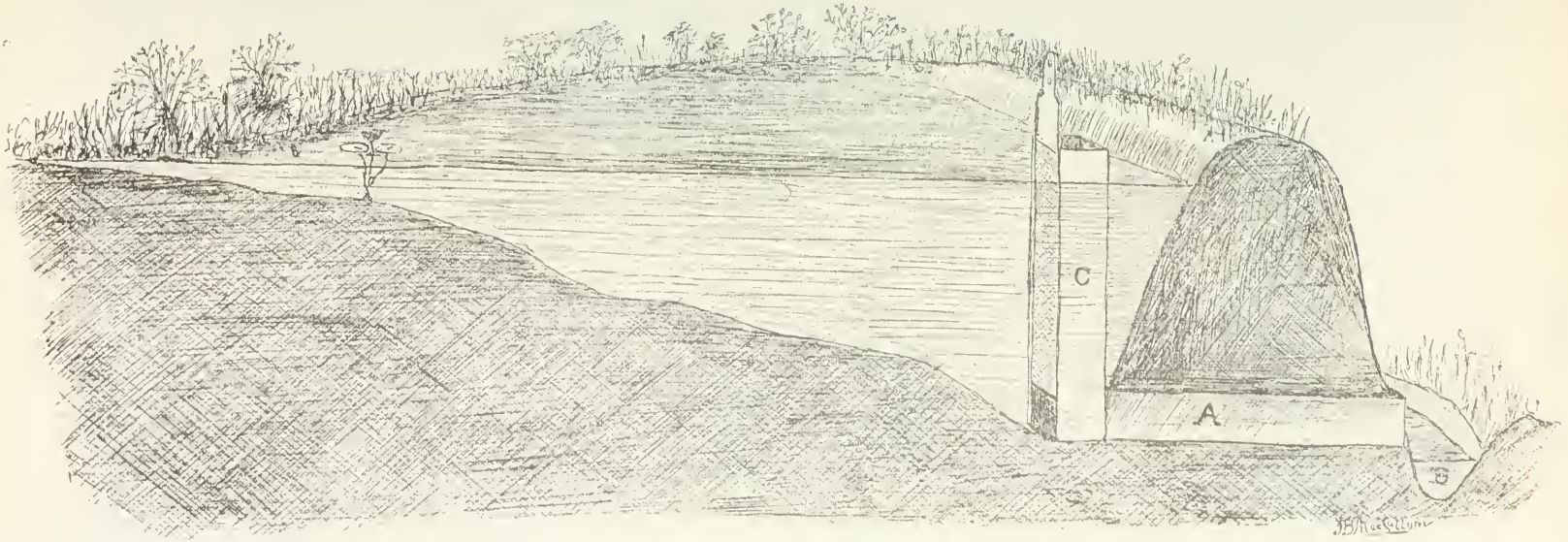

PLATE III.

the following diagram is taken from "Logan's Carp Culture," and will show at a glance how the most approved ponds are made. About the inlet and margin it is shallow and marshy and full of water plants, affording a good spawning ground. The bottom should slope to the deepest part of the pond, which is at the entrance of the drain pipe, A, which is shown in a cross section of the dam, terminating outside in a trap, B, to catch any fish which may possibly escape through the pipe A. This pipe is a box placed six inches below the lowest point in the collector, so that it will ensure the complete emptying of the pond. It is made of plank, 12 in. wide by 2 in. thick. The upright part, C, is of the same material and size, joins it at right angles, and is of sufficient length to extend some distance above the water line. The side of the upright next the pond is left open, except for a grating of wire cloth, and behind the grating and working in a grove on each side is a gate which may be raised from the bottom to allow of the escape of the water from the bottom of the pond—the grating forming a strainer. The whole of this woodwork will last longer if it is given a coating of coal tar. In case of freshets overflow ditches should be provided. The above description of a pond has been made with reference to carp ponds, but a similar plan would be quite suitable for bass or trout, although the latter fish requires spring water, with a creek running into the pond. It is also true that trout or bass, if successfully raised, will pay three or four times as well as carp. They are first-class game fish, and besides being better fish and sold at a higher price, more interest attaches to them in the estimation of sportsmen, and yet the carp is the food fish for the farmer to raise on account of the ease with which it can be raised, its size and fine quality for the table. It must not be forgotten that the carp is not a desirable fish to plant in the waters of the Province—that is, where other fish are—for they are credited of late years with being spawn and fry eaters, and multiply to the exclusion of other and better fish, much as the English sparrow does to the exclusion of other and better birds. So much is this the case that the Fish Commission of New York State felt it their duty to report as follows: "The Commissioners feel that they must in the future discourage the planting of German carp in the waters of the State that may contain other fish. It is no more desirable as a food fish than the common sucker, and instead of being a strict vegetarian, as was heralded when introduced from Europe, it has been convicted of eating spawn and fry of better fish." This is a very low estimate—too low—of the fish as a food fish, and as to its destructiveness it can hardly be said to be more voracious than trout, bass, or many other of the better fish which live even upon their own fry. In fish culture, as in every other industry, one will meet with many drawbacks, one of the worst being the number of enemies the spawn and young fish have to contend with, such as watersnakes, crawfish, muskrats, mink, turtles, birds and other fish, also many insects, larvæ and bugs. Some of the most destructive of the latter are shown in the cuts on Plates I. and II. Fig. 1, Plate I, is that of the Black Water-beetle (*Hydrophyllus piceus*) which is not of itself destructive to the fish, but its larvæ destroys all that comes in its way. Fig. 2 is its larvæ, Fig. 3 is the Yellow-banded Water-beetle (*Ditiscus marginalis*) which attack the fish themselves, even large ones, into which it fastens itself and eats holes. The larvæ, Fig. 4, is very voracious and lives upon young fish and tadpoles. Fig. 5 is the Water Asell (*Asselus Aquaticus*) a little insect about a half an inch in length. It is very destructive to fish eggs. Fig. 6, Plate II., is one species of the dragon fly (*Aeschma*). All of the dragon flies are very destructive enemies of fish. Fig. 7 is the larva of the dragon fly. It lives in the water, and is of a brown or green color; it is a good swimmer and usually lies hidden in the mud but with an eye out, and woe betide the young fish that comes within reach of his pincers. Fig. 8 is the Boat Fly (Notonecta glauca) a most voracious insect. It lives on young fish and tadpoles. Fig. 9 is that of the Water Flea (*Gammarus pulex*), which is like a small shrimp. In all its forms of life it feeds upon the eggs of fish, but itself becomes the best of food for fish in its turn.

Lastly, there is a plant growing in marshy waters, called Bladder Wort (*Utricularia Vulgaris*) which is very destructive to small fish fry by catching them in its little bladders and there digesting them. The fish culturist, knowing the enemies he has to contend with, is forearmed, and can take steps to protect his interests.

PRACTICAL NOTES ON THE CULTURE OF TROUT.

By Prof. Edward E. Prince, Commissioner and General Inspector of Fisheries for Canada.

Fish-culture embraces methods and operations very different from each other and dependent upon the particular species or kind of fish which it is desired to artificially propagate. The operations suitable for trout are not applicable to lake whitefish or to pike, perch, and black bass; nay more, the methods adopted for spawning the parent fish and hatching broods of fry are wholly different from those necessary for rearing and fattening yearlings and more mature fish.

The essential feature in the hatching of trout and salmon, whose ova are comparatively large and heavy, is the arrangement of the eggs in shallow perforated troughs over which pure fresh water passes during the period of incubation. If the eggs are loosely spread so that they do not unduly press upon each other, and if frost, excess of light, deleterious chemical and other influences are guarded against, the process of artificial hatching can be accomplished with facility. More than thirty years ago the Commissioner of Irish Fisheries hatched a quantity of salmon by a simple incubating apparatus in his office in the Custom House, Dublin—a clear proof that the obstacles to success are not serious.

Before commencing artificial fish-culture for the purpose of stocking any waters it is necessary to prove, as a first step, that the waters are suitable. Even streams and lakes, which once abounded with trout, may, during the process of depletion, have become altered in character, and no longer possess their former favorable features. A few adult trout transplanted from other waters will in a single season afford the required information. If the fish survive and flourish, there need be no fear of success. Such information is especially necessary in the case of artificial ponds or of waters which it is proposed to stock for the first time. Under conditions which are really unfavorable speckled trout will, of course, live, but not in a healthy, vigorous state. They will even survive in shallow stagnant water, where the supply is small and uncertain, but very different conditions are necessary for successful trout-culture.

If it is intended to hatch and rear trout from the egg the parent fish must be secured before the close season begins and retained in a pond until ripe, otherwise trout can only be secured by obtaining from the Minister of Marine and Fisheries a special permit, the conditions attached to which are very stringent. Trout, when two years old, will yield spawn, but as the number of eggs provided by them is small, and the eggs have been proved to be less hardy than those of older fish, it is preferable to select parent fish not younger than four years and not older than twelve years. Moreover, the large fish furnish a greater number of eggs, the amount being about 900 for every pound weight of the parent, and the eggs themselves are of larger size. A salmon produces eggs at least one-third larger than those of a small grilse, and the fry hatched from eggs of large size have been found to be finer, healthier, and of more rapid growth than from smaller eggs. This is as true also of the trout. The spawning season extends over a long period, and individuals containing ripe eggs may be found from late fall until spring. It is not necessary to describe the methods of obtaining parent trout, though the drag seine of one-inch bar, *i.e.*, about two-inch extension mesh, is very effective. The seine being an excessively destructive net is not generally permitted in Canadian waters, however, and it must not be forgotten that the barring of small steams frequented by trout and other fish is forbidden by law.

The requisite number of parent trout having been obtained and confined in a small pond ready for artificial spawning, it is necessary for at least two operators to assist in the work, one to perform the "stripping," the other to net the fish, as required, and hand the vessels, etc., to the operator. Kneeling on the ground the operator firmly but gently lifts a fish by the tail out of the landing net, using his left hand and resting its head for a moment on a towel, lightly passing his right hand towards the throat and grasping it with

the open thumb and forefinger under the breast fins, the other three fingers of the right hand being passed upon the left gill-cover of the fish. The back of the fish is pressed against the right breast of the operator and the tail bent back and upward. If the fish is fully ripe the ripe eggs will shoot out in a continuous stream and the assistant completes the operation by gently pressing upon the under side of the fish and passing his hand from the head towards the tail to expel the eggs that may not have run out. The eggs should not fall far, so that the assistant should hold or place on the left of the operator the shallow dish, which is to receive the eggs. No force is necessary. If the eggs refuse to stream out, the fish is most probably not fully ripe and a little patience will prove that. Some fish refuse for a minute or two to yield their spawn, and old fish always spawn less freely than young examples. Some manipulators wrap the fish in a towel leaving the snout and the hind part of the body free, others hold the fish's head or shoulders in the left hand, and grasp the under side of the body with the right hand, holding the tail down and slightly pressing with the right thumb. There are disadvantages connected with these methods; but in all alike, patience and gentle handling are essential. The fish should not be unduly disturbed or roughly treated, and spawning can thus be accomplished without the slightest possibility of injury. Very large and strong fish may demand the united efforts of two operators. When four or five female fish have been spawned into the plate, yielding, say, 10,000 ova, the assistant must then land in succession two or three ripe males. Each fish should be brought close to the eggs as they lie in the plate, and as soon as the abdomen touches the eggs a large flow of creamy milt will be forcibly ejected. The plate should be turned around as each new male is brought so that all the eggs may receive a share of the fluid milt. A slight pressure of the right thumb and finger behind the breast fins and further back will increase the flow. The milt of a single male will suffice for an extraordinary number of eggs if both sexes be in fully ripe condition, and in cases of necessity one male may, with confidence, be used to fertilize the ova of five or six females; but where possible the first named proportion is safest. The vivifying or fertilization of the eggs will be aided by gently stirring them with a clean feather after milting, and adding half a pint of water to dilute the creamy milt. Each dish when thus filled and stirred should be placed on one side and five more females spawned into another dish. In half an hour they should be placed in a large vessel, a clean wooden bucket, and placed under a gentle flow of clean water, to wash all impurities and excess of milt away. The eggs will appear no longer soft and yielding, and instead of clinging together will be hard to the touch and separate from each other. They are very elastic and will endure great pressure. Thus Frank Buckland, the most famous of English pisciculturists, placed upon some trout eggs a weight not less than five pounds six ounces before he could crush them. Nevertheless pressure, especially upon newly fertilized eggs, is highly injurious.

It is necessary to place the eggs, after being cleaned, upon the hatching trays. These consist of lightly made square frames of wood, across which is stretched japanned wire cloth, though in the Government hatcheries perforated zinc trays, black japanned, have been found advantageous.

The following five conditions are necessary for successful hatching:

(1) A supply of water which is regular and unfailing.

(2) Water of even temperature, that supplied from a spring at some depth beneath the ground is preferable.

(3) Freedom from impurities and sediment, which suffocates the eggs, hence the supply of water should run into a tank to allow sediment to settle before it runs over the hatching trays.

(4) The quantity desirable is about 100 gallons per hour for 10,000 eggs The greater the quantity of water the better, as eggs actually breath water and need ample supplies of oxygen which the fresh inflow of water contains.

(5) Protection from floods by means of guards and an overflow ditch higher up than the supply pipe. While spring water from its equable temperature, purity and other

features, is always preferable, yet when incubation has advanced to what is called the eyed-egg stage, water from a brook or river will serve quite well.

Trout eggs hatch out in from 50 to 150 days, according to the temperature, amount, and rapidity, as well as the character of the water. Water from limestone strata is generally held to be best, and the greater the quantity of water the longer can incubation be protracted. Temperature is of course most potent and a change of one degree Fahr, rise or fall, shortens or lengthens the process of incubation four or five days. Eggs of trout which hatch out in fifty days when the temperature of the water is kept at 50° Fahr., will take 100 days if the temperature is kept as low as 40°. The filled hatching trays are placed in wooden boxes open at the top, and a flow of water through the boxes must be arranged to ensure two inches or less of water over the eggs. Direct light should be excluded to discourage fungus growth. Dead eggs should be picked out each day. When eggs die they lose their delicate transparency and bloom, and assume a dead white appearance, and unless removed a feathery fungus rapidly covers the egg, and spreads to other healthy eggs. Hence the necessity for promptly removing them. If eggs require moving on the tray it should be done gently with a soft camel hair pencil or brush. They may be softly swept into a spoon when it is desired to remove a few from a tray. A tray may be emptied by lifting it out of the water and skilfully overturning it into a dish. Eggs must never be touched by the hand, and dead eggs are best removed with wooden pincers or forceps.

Hatching and rearing boxes require to be blackened inside. Charring is much to be preferred to black varnish. Black paint must be avoided. Hot blocks of iron 20 lbs, or 28 lbs., weight are closely applied to the surface to be charred and this close contact prevents burning. All boxes, trays, etc., after charring, varnishing, etc., must be well seasoned in water some time before hatching operations begin.

When the delicate young fry, called "alevins," begin to hatch they do so in such numbers that special tanks are necessary to which to transfer them. Many of the fry cannot free themselves from the egg shell or capsule, and require a little skilful help by means of an artist's camel-hair brush. When not more than two hours old the little fish have intelligence enough to dart away from danger. It requires some agility to capture one with a spoon. A scoop of fine gauze or perforated zinc is effective.

The following points may be noted in connection with managing the fry :

(1) They should be exposed to very little light.

(2) No food is required until the large bag of yolk attached to each alevin is almost absorbed.

(3) Prevent massing together, their jelly-like bodies when crowded togother result in suffocation and death.

(4) Cover the exit with fine gauze to prevent the tail and yolk-sac of some of the fry passing through, and occasionally sweep them gently away from the point of outflow.

Before the yolk is gone, trout fry will pick up minute particles of food, but they may be fed on hard roe of flat fishes, or mackerel, or other fish with very small eggs, which are easily scattered amongst the hungry alevins. Liver and rock-mussels finely minced form good food ; but very little should be given at a time as fragments falling on the floor of the tank pollute the water. Opinions are divided as to the advantages of planting young fry, or of keeping them until a year old.

Only a small proportion can be artificially reared under the most favorable circumstances, and their growth is always stunted as compared with those in their natural haunts. Early planting, i.e., the planting of fry within a short time after hatching and before the yolk-sac has wholly disappeared, possesses many advantages. In one well-known experiment, the fry which were planted early were found to have increased in nine days to four times the size of those of the same brood which had been confined in rearing troughs. There is no doubt also that yearlings, artificially fed, learn to trust to artificial protection and sustenance and are unfitted for the perils of natural waters when turned out. Yet, even not more than one yearling in ten can be reared from the

alevin stage, this is a great gain over the natural rearing which almost certainly ensures the destruction of nine hundred and ninety-nine in a thousand fry hatched on the "redds" or natural spawning beds.

A young salmon weighs less than two grains; thus it takes nearly 250 alevins to make up an ounce. Yet in sixteen months a weight of 2 oz. is reached, and twenty months afer when as a smolt he has betaken himself to the sea and in a short while become a grilse of 7 or 8 lbs., i.e., achieved an increase of 68 times his weight in three or four months, his advance has been most marked, and may continue until, say, a weight of 30 lbs. has been obtained, or an increase of 115,000 times his original weight. The rate of growth was clearly demonstrated by the late Duke of Athol's experiments over thirty years ago, when three salmon were marked by means of copper wire around their tails. They were descending to the sea, and weighed 10, 11½ and 12¾ lbs. respectively. Six months later they were retaken ascending the river from the ocean, and showed an astonishing increase in weight, viz., 17, 18 and 19 lbs. respectively.

Trout ponds for rearing and fattening purposes should be:

(1) Edged with charred wood, which is much better than earthern banks washed by the water.

(2) Sloping to the north and sheltered from the east.

(3) Not deeper than 5 to 8 feet, and shallower (say 3 feet) at the ends. The outlet should always be shallow, but trout will flourish in water 18 to 20 feet deep, though they are apt to get out of control and are difficult to manage from a pisicultural standpoint.

(4) Sheltered so that the fish can find cool water in summer. Trees or overhanging wooden shade fences will prevent a high temperature, which is injurious.

(5) Secure from land and water-enemies, thus eels, rats, water-beetles, insects, reptiles and some birds are most destructive. Many animals and birds which never prey on fish are cruelly killed because suspected. Thus, in England, the water-ouzel has been mercilessly shot, though an examination of hundreds of the slaughtered birds showed that they feed only on insects and the grubs which destroy fishes' eggs and young. One fish culturist published his confession that for years he had been shooting his best friends as no traces of eggs or fish had been found in the digested food of these birds. It is probable that muskrats and other rodents live solely on leaves, roots and vegetable matters, but the real enemies of fish should be prevented from making inroads on retaining ponds.

One word of warning is necessary in view of a common opinion that German carp and other coarse fish merit the attention of fish culturists. In pure and prolific waters, such as those of Canada, abounding in trout, salmon, and all the highest grades of fish, these low, inferior kinds are a positive curse and injury if introduced. They increase fast survive under the most unfavorable conditions; but their propagation in Canadian waters is little short of a crime, and entails the destruction of food upon which the finer indigenous kinds live, and the crowding out of the splendid fish native to our rivers and lakes.

Even of the higher kinds, the salmonidæ, there are species and varieties which should be regarded with disfavor, especially those from the Continent of Europe. German and Austrian trout, full of the germs of disease, should not be hastily introduced, and in this connection, the words of one of the most experienced and successful fish culturists of modern times, Sir James Gibson-Maitland, of Hawietown, Scotland, may be quoted as a final caution. Speaking of the changing conditions in the waters of America, and the possible decrease of the finny population, especially salmon and speckled trout (S. fontinalis, Mitch), Sir James Maitland says: "That nation, wise in fish culture, will soon fill their streams with trout already accustomed through centuries to the interference of man; not trout imported from the forest streams of Norway, or the mountain lakes of Switzerland, but good honest British trout, which, a hundred generations ago, made acquaintance with mill weirs and sunny streams. Civilization must breed its trout, as its cattle, or civilization will have no trout."

SPECKLED TROUT AND BLACK BASS.

By Edward Harris, Port Dover.

If the decision of the Judicial Committee of the Privy Council gives the ownership of the fisheries to the provinces, it will naturally put more life into the fishery question in Ontario. Under any circumstances Ontario is now far behind the neighboring states in all that relates to trout and bass culture. Twenty-five states have established hatcheries for the free distribution of trout, bass, and other game fish to re-stock the various streams, ponds, and other waters. This is in addition to the regular distribution of fry for commercial or net fishing, and solely to provide rod fishing with hook and line for the amusement, health and recreation of the people of those states, tourists and visitors.

A good sized volume could be written upon the subject of the destruction of the trout and black bass which once inhabited the streams and waters of Ontario. In that belt of high land running from the Lake Erie shore of Elgin and New York to the northern peninsula of Bruce and Grey, dividing the old settled portion of Western Ontario in the centre, there are traditions of trout streams, once as famous as the Nipigon, as well as rivers and streams teeming with black bass from end to end. It cannot be that our agricultural population are behind the same class in the neighboring states in intelligence Still no pressure has ever been put upon the Government to re-stock the streams and bass waters of the province. The money appropriation required for the purpose is fractional compared with the beneficial results to follow. Our Federal Government has done something for commercial fishing by making an effort to re-stock the great lakes and salmon rivers with white fish, salmon trout, and salmon. In the neighboring Republic this has not only been done by the Federal Government, but the various States have done even more to re-stock private as well as public waters with brook trout, bass and other game fish for recreation purposes, and that done not only free to applicants but with free delivery. Take the State of Pennsylvania, the oldest settled state in the Union, ten years ago their trout streams and bass waters were utterly depleted. From 1891 to 1896 that State distributed free to applicants and paid freight on 13,910,891 brook trout to stock the streams of the State, and did it with success. The distribution on this plan still goes on. The same thing is done in Michigan, Ohio, New York, Massachusetts, Maine, etc.,—in all twenty five States. These States also distribute California trout, brown trout, black bass and other game fish.

The State of Pennsylvania has only forty-five miles out of nearly 800 miles of water frontage on Lake Erie, and from 1891 to 1896 they planted in Lake Erie 131,800,000 whitefish and 223,900,000 yellow pickerel, and other high class fish; the entire distribution of young fish for that one State in six years amounting to 502,025,517. It must not be forgotten that this is but the work of one State. Wisconsin, a new State, has done more, and has constructed one of the most complete fish hatcheries in the world. Neither the Federal Government of the States nor the separate States derive any revenue whatever from the fisheries, while the Province of Ontario alone pays our Government $35,681.68 annually in license fees. That there is lethargy on the part of our people in this matter is plain. Governments no longer take the lead in matters of this kind. The modern legislator follows public opinion; he no longer leads. The people have been educated, and if they want any special legislation they must make the local representative understand that it is required. A depleted trout stream is not unlike an exhausted farm. Skill and care and proper husbandry are required to make it again reproductive. A trout stream once exhausted may give a few days fishing every year to some of the local idle boys or to an occasional elderly "dead beat." The same stream stocked and cared for under proper regulations would give amusement, recreation and plenty of fish to the industrious classes in the country, both male and female, who best deserve a holiday. In Ontario our rivers and streams have become a desolation. The cities and towns are largely made up of men country born and country bred, but the thousands of employees in financial, commercial, legal, medical, educational and various occupations and institutions, chiefly sons of farmers, leave the old homestead seldom to

return. Amusement with rod and gun, the two great attractions connected with country life, are gone. Happily, if the people desire it, all can be restored. The artificial reproduction of brook trout or speckled trout is so easy and now so well understood that it is a waste of time to describe the process. With few exceptions any streams, ponds or lakes which once abounded in trout can be successfully restocked. The temperature of water can always be lowered by planting trees for shade at exposed points. Any streams or waters having water too warm for trout are, as a rule, admirably suited for black bass, a fish equally attractive both for sport and the table as brook trout. Bass culture not being so well understood as trout culture a few remarks on the subject will be in order. It is now generally admitted by scientists that the proper way to reproduce black bass for re-stocking purposes is to take the parent fish, place them in artificial or open small ponds, and let them make their nests and rear their young. They may be allowed to spawn in ponds of quarter of an acre to two acres. The bass mate and nest like robins. The nest is concave with a diameter from two feet to three feet six inches. The period of incubation is about nine days. The young are born, like most young fish, with a food sac which lasts about one week. After this is exhausted the young disperse in search of food, and until then they are closely guarded by the parent fish. If there is any vegetation in the ponds the young will find plenty of proper food. When one inch long they will begin to eat smaller fishes if they can find them. When about two inches in length it is better to remove them from the smaller spawing ponds. It is easily done. Various plans are adapted and none which cannot be improved upon. Successful bass culture makes it necessary to keep the larger and smaller of the young fish separate. A bass three inches long will swallow another of one and a half inches and prefer it to any other food. Brook trout are equally inclined to cannibalism and require classification. Bass fry can be safely handled for shipment when one and a half to two inches long. There is not an old settled county in Ontario in which there are not streams, rivers, ponds or small lakes admirably suited either for bass culture or re-stocking. Muskoka and the northern counties are naturally a fisherman's paradise. Yet nothing is done except to continue the same process of destruction, which is part of our own history since the first settlement of the country.

The Commission of Industrial and Labor Statistics for the State of Maine as far back as 1893, estimated that their summer visitors from out of the State left within it every year as the cost of their living the sum of $10,000,000, and that fully $3,000,000 of that sum could be directly attributed to the attraction of fishing and shooting. It is believed that since that date these figures have been largely increased. In the summer months, from May until October, for climate, fishing and shooting, the Province of Ontario is most accessible and should, if proper attractions were offered, be filled with tourists from end to end from those rich but over heated States south of us.

HOME DEPARTMENT.

CHILD CULTURE.

By Mrs. S. H. Neilson, Stony Creek.

Herbert Spencer says, "The training of children, physical, moral, and intellectual, is dreadfully defective." Why? Because in a great measure parents are devoid of that knowledge by which this training can alone be rightly guided. What can be expected when so many undertake the rearing of children without scarcely giving a thought to their character-forming. For all trades and professions a long apprenticeship is necessary to success. Is then, the unfolding of a human being in mind as well as body, such an easy thing that anyone can superintend and regulate it without any preparation whatever! I give you a quotation from the Parents' National Educational Union of 1893:—"No other part of the world's work is of such supreme importance, difficulty, and delicacy as that of parents in the right bringing up of their children. The great obligation of the present generation—that of passing forward a generation better than ourselves—rests with the parents, and yet parents with the responsibility of the world's future race resting upon them, are left to do their work alone, rarely getting a word of sympathy or encouragement."

How few girls reach the age of twenty without having in some way or other the care of children! Most if not all of us are aware of some failing that has proved a stumbling block to us all through our lives, that might have been easily cured in childhood. Some may say, the child left wild does the best. Is a wild rose to be compared to a carefully cultivated one, or an untrained horse to a well bred, well cared for one? We hear of classes for all kinds of accomplishments now-a-days—their number is legion; but we could easily count on one hand classes for instruction in "Child Culture." Our daughters must be accomplished. Do we stop to think that many of those girls are to be the mothers of the future generation? Should they not know something of the great responsibilities that may some day be laid upon them

There are so many means of child culture that it would be quite impossible to touch on all, so I will just give you a few suggestions. First, character-forming by mental means—that is, by ideas. Second, by good suggestions. Third, by a living example.

(1) Ideas are the seeds we sow in their minds; if fertile, they will bear an abundant crop. How necessary, then, that first ideas should be good. Life grows on ideas. Dr. Schofield says: "A child may go through years of so-called education without getting a single vital idea, and that is why many a well fed body carries about a feeble starved intelligence." What is an idea? A live thing of the mind. Ideas in children may exist in clear distinct form, or they may surround them as an atmosphere which they breathe as the breath of life. Every gentle look and tone of reverence, every word of kindness, and each act of help passes into this atmosphere. A child in the home is a dreadful as well as a wonderful presence, bringing great love and great responsibility. The child has affinities with evil as with good. Then how careful and watchful we should be to hedge it round with good ideas and thoughts. Often the destiny of a life is formed in early childhood. Mothers possess great power, by imparting good ideas, to mould their children's characters.

(2) *Good Suggestions.* Do not constantly tell a child he is naughty and does bad things on purpose, or "You don't care to do what you are told," or "You don't love mother or you wouldn't do such things," and so on. Assume the child meant to do right but forgot; let the child's mind always be directed to what is good and lovely, so helping to produce in the child the very character you assume it has.

(3) *By the Life.* Example is the greatest of all character-formers. The parent should be self-controlled, truthful, unselfish, and, above all, loving. Say what you mean, and mean what you say. Do not make a promise thoughtlessly, but when made keep it faithfully. To live a good example before one's children requires a living, vital christianity, a daily watchfulness of self, and entire dependence on God. This mind-culture cannot begin too soon, as the foundations of character should be settled before the child is ten years old, during which time the child is much with the mother. The disposition of the child should be carefully studied. Ruskin says, "All culture that does not tend to make child life joyous and contented is a failure." Keep the child's confidence, encourage it to tell its failures and faults, give your sympathy and encouragement. Happy indeed is the mother's who succeeds in keeping her children's character transparent until they are children no longer. Guard against bad influences, light words about sacred subjects, about sin, and about parents and neighbors, and, above all, teach them that "God is love" Do not be afraid to let your children see you praying sometimes, and pray not only for them but with them, and you will have the joy of seeing them as you would wish—good men and women of strong character, an honor to any country.

SOCIAL AND INTELLECTUAL LIFE ON THE FARM.

By Albert Davidson, Glandine, Ont.

Wishing to lead you in a discussion this afternoon. I have selected as a topic, "Social and Intellectual Life on the Farm." I believe this to be an important subject, but a much neglected one. I dislike to speak upon it, as it shows farm life in an unfavourable light. Now, in describing the conditions under which some farmers and their families live, I do not wish to overdraw the picture, but to direct your attention to this subject, that we may, if possible, find a way by which these conditions may be improved. Farmers provide well, and even abundantly, for the material welfare of their families; but too often they stop there and provide nothing for the social nature or intellectual tastes. We know that often there is no effort given to make the house attractive. When the day's work is done, the young people are left to do the chores or amuse themselves as best they can, and though the chores may be many the amusements allowed are usually very few. Farmers' children get exercise in abundance, and therefore have little desire to spend their scanty leisure in such active games as baseball, cricket, or even croquet; or if they wish to, they live so distant from each other that they cannot form satisfactory clubs. Public entertainments are seldom within reach; while many popular forms of amusements their parents condemn. Reading is not encouraged, and literature is often very scantily supplied. Perhaps the Bible, the Catechism and the almanac would be a fair sample library, supplemented ocasionally by a stray volume, such as The Pilgrim's Progress or Robinson Crusoe; more usually, perhaps, by the local newspaper, which keen parental oversight insures being of the right stripe of politics. Visits to and from neighbours are not now common; while logging bees, quilting parties and apple parings are almost a thing of the past Again, the influence of prosperity has shown its effects by forming castes in society; the land owner does not associate so freely with the tenant, or the tenant with the laborer, as was the case a few years ago, when a neighbor was a friend without any regard to his wealth, his religion or his politics. Our farmers are very industrious, and I know how many hours they work. I know that when the day's toil is over, they are so tired in body as to be unfitted for mental effort. I know that there are many poor, deserving, hard-working farmers in this country who are performing much more labour than they should. But hard as they work, it is even harder for their wives, who rise early and seldom go to rest until 9 or 10 at night. They work without ceasing the whole of that time, and are receiving no other reward than food and the plainest of clothing They understand something of every branch of economy and labour, from finance to cooking, and no incompetence is excused. Though harrassed by many responsibilities, though

driven and worried, they never revolt, and they cannot organise for their own protection. Not even sickness releases them from their posts, and I am unable to even suggest a plan for their emancipation, unless it should come as a natural sequence from a more intelligent management of their affairs. This life of labor, isolation and restraint has a peculiar effect upon the mind. Many of the tasks upon the farm, when once familiar, are performed almost mechanically, and the mind is free to dwell upon other subjects. As day after day is followed in a monotonous routine of solitary labor, many form eccentric habits, such as speaking to themselves, and are liable to become bigoted in religion, biassed in politics, or cranks upon some other subject; and let such a person's ideas be ever so erroneous it is difficult and often impossible to reason with him, for his thoughts are his companions and friends, and if you assert contrary opinions he resents them as though you had offered him a personal insult. From life under these conditions we naturally shrink, and this I believe to be the true reason why so many dislike the farm, and which alone prevents it from being the most attractive of any calling or profession. However, a man of mature years who has become habituated to those conditions will be very slow to change. We find him unwilling to adopt improved methods or practices, even though they prove vastly more economical and remunerative, and meetings like these which are held for his especial benefit, are often poorly attended. Fortunately his children are receiving a much better education than was possible for him in his youth But on leaving school they long for books or papers whereby they may gain a glimpse into the world of science, of literature or of art, and this wish must be gratified if we are to retain them on the farm. I know that many farmers feel that they cannot afford to gratify the intellectual tastes of their families Now I do not think that we have many farmers in this country so poor that they cannot set apart something for such a purpose. If you are, think over your business—is there not some neglected branch from which at present you derive no income? It may be a few hives of bees, a small orchard, an uncultivated plot of land, or the poultry. Tell the boys and girls that whatever they can make from such a source may be theirs to apply to the purchase of books, papers, music, etc, and you will soon see that that branch of the business is no longer neglected, and that the revenue therefrom is quite sufficient for the purpose, while the time spent upon it might otherwise have been spent in a less desirable manner. This alone will add much to the interest your family takes in the farm, and that interest usually results profitably, while increased knowledge will increase the interest, the pleasure, and finally the profit, for it is a pleasure to watch the unfolding of the leaves of the development of a plant when we comprehend in some measure the causes which produce those results. With what interest we note the variations in animals and plants and trace out link by link the wonderful manner by which every living creature is related the one to the other. It will also reconcile them to their work, for even picking stones is not so disagreeable a task when we know someting of the diffrent strata of rock which compose the crust of our earth, and the wonderful manner by which those various specimens are distributed As they perform this almost mechanical toil their minds will not dwell likely upon the hardships of their position, but find in nature an inexhaustible study of absorbing interest. But there is an isolation in farm life which renders it distasteful. Bright young people of fair education feel this, and I claim that if you put a boy on the farm at hard manual labor without allowing his access to books, papers or social intercourse, you bind his thoughts, blunt his hopes and steal his joys, and may discourage, and thereby destroy, one who might have done much to improve the conditions under which we live, for the history of the past shows that the farm boy of the present may become the statesman of the future I know that in promoting a more social life amongst farmers we shall find many difficultis Various lodges and benevolent societies have endeavoured to aid in this work, but like churches of different creeds and opposing political parties, they have a tendency to gather the people into separate groups which are more or less antagonistic to each other, and this is a fatal objection. I have thought that if in every school section there could be formed farmers' clubs or literary societies, where all could meet on terms of equality, where religion and politics would be carefully excluded, topics of interest debated, good readings or proper songs delivered, it would result in much good, especially to the young. Through such a society

they would meet those of like education, sympathy and pursuits, while their minds would conceive and develop ideas of progress, justice and brotherhood, which would unite in bonds of unity the discordant elements of which many neighbourhoods are composed. They are discordant, but I believe not because of any lack of peaceful or kindly feelings, but because they differ in nationality, religion and politics, and because reserved habits have prevented them from becoming more fully acquainted with one another. Such a society would also pave the way for the organization amongst farmers of various co-operative schemes which should be for their mutual benefit. I might even claim that it would pay, inasmuch as the selling value of property largely depends upon the intelligence and harmony of the people of any particular neighborhood.

PAPER PREPARED AND READ BY MRS. R. C. TYE, HAYSVILLE.

At a Farmers' Institute Meeting in Haysville, Waterloo County.

"Work! Work! Work!" to the farmer, his wife, daughters, or sons, must be no dreaded word. It is the greatest mistake, though we are often inclined to think otherwise, that a great scarcity of work would bring happiness. The decree to earn our bread by the sweat of the brow was not the worst but the best in our present state, for God ever seeks man's best interest. Therefore, let us be of those who are determined to do something useful; that whatever may be prepared for us hereafter or happen to us here, we will at least deserve the food God gives by earning it honorably, and that, however fallen from the purity or far from the peace of Eden, we will carry out the duty of human "dominion" and dress and keep the wilderness, though we may no more dress and keep "the garden."

A young lord was once visiting at a friend's in one of the large cities in this country. After being there some time his friend asked him how he liked the country. "Oh, very well, but I notice you have not many gentlemen." "What is your definition of a gentleman?" asked his host. "Why one who has no work to do." "Oh we have plenty of them, but here we do not call them 'gentlemen,' we call them 'tramps.'" I honor our young and stalwart Canadian farmers, who, though toilers, can be gentlemen; and especially would I offer to the veterans my highest tribute of respect.

"All honor be then to those grey-haired men
When at last they are bowed with toil,
Their warfare is o'er, they battle no more
In conflict with the soil
I had rather take aye a hearty shake
From that hand than the wealthiest bow;
For the honest grasp of the hand's rough clasp
Has guided the good old plow."

I do not undervalue recreations for pleasure, but that we should take pleasure in our work also. Generally we are under the impression that a man's duties are public, a woman's private. But this is not altogether so. A man has a private duty relating to his home and a public work or duty, which is the expansion of the other, relating to the State. So a woman has a private duty relating to her own home and a public work or duty. Now a man's work for a home is to secure its maintenance, progress, and defence; the woman's, to secure its order, comfort, and loveliness. These duties are to be expanded into public work by both man and woman, but there is no arbitrary law in reference to these duties. A man may seek to make his home lovely; a woman may seek its maintenance and progress. These gentlemen (the speakers) do not come here merely to play a harp for us to dance to. No, what they tell us means hard and painstaking work. If we think new methods will bring a surcease of toil, we are much mistaken. Many of the new ways of working involve more labor than the careless habits they are intended to supercede, but it is because of the results brought about by the better methods that they are so insisted upon, for we require the best results obtainable in handling farm produce in order to secure the mainten-

ance and progress of our homes and nation, for on agriculture a nation's welfare largely depends. The careful experiments and intelligent application of what has proved to be the best, has brought about a much needed change in many things connected with farm life. But all have not yet learned. Take for example butter-making; I fancy our merchants could tell us there is yet a great difference in the samples brought to them. Yes, as much as there is in a recitation given by a cultured elocutionist and one given by the ordinary school boy.

COMFORTS ON THE FARM.

By W. M. Grant, Woodville.

In recent years many farmers have built comfortable stabling for their cattle and horses, and suitable accommodation for other farm stock. They have learned much in the matter of feeding stock so as to get the maximum results from the minimum cost of feeding. In the matter of tilling the soil they have learned to husband its wealth, and many of them have succeeded in restoring much of the richness that years of over and improper cropping had taken away. But how many of them have learned how to house and feed themselves and their families? How many in building have considered the best means of saving steps for their wives and daughters, or of preserving their own and families' health? How many wives and daughters have learned or have tried to learn how best to cook to produce as good results in the feeding of their husbands and brothers as their husbands and brothers have produced in the feeding of live stock? The last question is worthy of much thought, but I will not attempt to discuss it more than to recommend the ladies to study the subject of food in order to learn what substances are necessary to nourish and build up the human body, to learn what articles of common food contain these substances, and having learned these to so combine the articles and cook them as to produce a perfect food The question of house-building and home-making I wish, with your indulgence, to consider at greater length.

Very often in visiting city houses we are constrained to regret that those who live in the country are deprived of so many of the comforts that those who live in the city enjoy. In entering the urban residence we find that it is well heated throughout, there is an even and steady temperature, and when we rise we take a morning bath in a well equipped bath-room, and dress with comfort. During the day we visit the kitchen to find it provided with a sink and a plentiful supply of hot and cold water. On the other hand, in a large number of country homes we find every part but the kitchen inadequately heated in the evening, and freezing cold in the morning. In the kitchen there are few conveniences, the supply of soft water has to be hauled from an outside cistern, and the hard water from a well usually at or near the barn; no bath-room is provided to encourage that attribute that is placed next to godliness. Happily, however, the time is past when the conveniences and comforts of the city home are considered impossibilities on the farm. If you will pardon personal reference I will describe a house I built this summer, which is supplied with all the conveniences I spoke of finding in the urban home. In planning the house I provided for a bathroom just over the kitchen, and in furnishing I had the bathroom fitted with a bath-tub, a stationary wash stand, and a flush closet. I had also a large-sized tank put up just off the bath-room to give a supply of soft water and a water pressure. In the kitchen is a range with hot water front, and attached to it is a 30 gallon boiler which is fed from the tank directly over it, so that both in the kitchen sink and in the bathroom we have an abundant supply of hot water as well as cold. The refuse water from the kitchen sink and from the bathroom, as well as the night soil from the closet, are carried away through 4-inch metal sewer pipe outside the house, and from there to a cess-pool some distance away through 6-inch glazed sewer pipe.

Then, to have a supply of hard water for cooking and drinking purposes, I had an elevated tank built in the barn. The water is pumped into this tank by a windmill and will be conducted through an underground iron piping to the house. I have not yet, however, completed the connections. My house is heated with a No. 3 Oxford hot-water boiler, which burns either wood or coal, but I prefer the latter. So far this season I have found an even temperature throughout the house and a genial temperature in the morning. Never during the recent cold snap has the thermometer gone below 58 degrees in any part of the house at any time of the day or night, and that, too, without any extra fire. Of course these extra comforts mean an extra outlay of money, but the extra cost, it seems to me, is not at all in proportion to the extra comfort. We are in this world for the last time, and surely we should endeavor to enjoy this single journey of life. In the matter of material comfort, as well as in all other matters pertaining to life and character, we would do well to ponder deeply the words of the poet:

"To thine own self be true
And it must follow as the night the day
Thou can'st not then be false
To any man."

But the house we live in and the food we eat are not all that we should consider besides the physical there are the intellectual parts, and if we are to build up a perfect manhood the intellectual cannot be neglected, nor should it be in these days when reading matter can be had at so small a cost. Take for instance the Farmers' Institutes. For an insignificant fee we are supplied throughout the year with a large amount of information that, to all who are trying to make farming a success, is invaluable. Then there are the Mechanics' Institutes for general reading, and the publishing of standard works at a price within the reach of everyone. And last, but not least, there is the Ontario Agricultural College. Perhaps there are some who cannot afford to take a course in this institution, but those who can are doing themselves an injustice so long as they fail to take advantage of it. There the young men receive a practical training and at the same time a training in the science and theory of farming, and in addition they mingle with other young men and in this way learn much of their fellow men that those who never leave home are ignorant of. It has been said, and truly, that the individual is the ruler of the home, and inasmuch as individuals make up the nation the home must be a potent factor in shaping the destiny of the country. Then it rests with us to make our homes happy, and in so doing we will do something towards making this Canada we love so well a land of peace, happiness and plenty.

GENERAL DEPARTMENT.

THE FARMERS' INSTITUTE.

By J. G. Foster, Moira.

The organization of Farmers' Institutes is permitted under an Act passed for that purpose by the Ontario Legislature. One Institute may be organized in each Electoral District or Riding, on condition of having fifty members, each paying an annual fee of twenty-five cents. The Institute year begins on the 1st of July and ends on the 30th of June. The annual meeting is held on the second Tuesday in June of each year at one o'clock p.m., for submitting reports, election of officers, and selection of places for holding meetings for the following year. The officers consist of a president, vice-president, and secretary-treasurer, who, together, form the executive committee; and one or two directors from each municipality in the district. All memerships terminate on the 31st of December. The organization and carrying on of Institute work shall be strictly non-partisan and non-sectarian, and subjects on these lines shall neither be presented nor discussed, but such subjects only as are calculated for the equal benefit of all citizens and farmers generally. The objects of the Institute are as unselfish as they are non-political. The real object and purpose of the Institute seems to be greatly misunderstood by very many and looked on as something of very little importance to them as individuals or the communities where they are held. These meetings, if properly appreciated and attended, must surely be a powerful agency or means of diffusing knowledge of the best and most successful methods of farming. We can learn much from the experience of practical men who come to address the meetings on the intelligent application of practice and principles that are approved of by successful men. We can learn from the experience of each other. We can exchange ideas and discuss questions pertaining to our business, both in producing, caring for, handling, and marketing our various farm products. Only a few years ago our Government, under the Dairymen's Association, sent out men who were called cheese instructors and milk inspectors. These men not only assisted the cheesemakers in the most approved methods of handling milk and manufacturing the finest quality of cheese, but by thoroughly and carefully testing the milk of all patrons, and instructing them in the proper care and handling of the milk, the best varieties of food, the necessity of good pure water, etc., they encouraged and assisted those who were ready and anxious for improvement, and to a large extent compelled the careless and dishonest patron to co-operate in furnishing a good quality of milk to the factories. The result of this wise movement has been the placing of our cheese product on the highest pinnacle of fame, and creating for ourselves a name and prestige among the nations of the world which we would not perhaps have otherwise enjoyed; and as "eternal vigilance is the price of liberty", we must be earnest and vigilant in our efforts to maintain the proud and enviable position we have striven so hard to reach. The question that agitated and weighed on the minds in those Dairymen's Conventions was, How shall we reach the masses? and, while the instructor system has reached many in the one particular industry, it appears to me that the solution of this great problem—the best and most complete answer to this great question—is through the Farmers' Institute. While this dairy industry is one of very great importance and interest to us as a people, we believe there are other phases of agricultural life, and other lines of agricultural industry, that are of equal if not greater importance. There is a great work for the Institute to do in bringing to the masses the knowledge of the most scientific and practical methods of carrying on and developing these industries. There is the poultry and egg industry, the bee industry, the small fruit industry, all or any of which may furnish very profitable employment and investment for many of our people. It will be a grand thing for us as agriculturists when we rise to a

proper appreciation of our position, when we realize that there is no higher or nobler calling, none that requires greater intelligence, thought, or study. We need more information—more light ; we need to become more enthusiastic in our avocation and in our pursuit after knowledge respecting it. In what way can we secure so much valuable light and information at so little cost as through the Farmers' Institute? The reports and bulletins, as they come to us, contain a very large amount of useful information ; and in our meetings our intercourse tends to bring us into into closer relationship with each other.

Prof. W. C. Latta, of Lafayette, Ind., beautifully summarizes the work of the Farmers' Institutes when he says, "They have done much to destroy the feeling of antagonism between town and country which has been so prevalent ; to foster friendly relations among the agricultural classes themselves ; to increase the general intelligence of the farming classes ; to foster the desire for the more thorough education of farmers' sons and daughters as a means to higher success and greater happiness on the farm ; to point out the causes of failure and the conditions of success, and thereby improve the methods of agriculture ; to awaken new interests and pride in agricultural pursuits ; to lift those classes up to a higher plane of living and achievement, and to a clearer recognition of the duties, responsibilities, and privileges of the farmer as a business man, neighbor and citizen." I am glad that both our Dominion and Provincial Governments have given us practical farmars as Ministers of Agricultre. May it ever be so. This encourages us to hope that our calling will receive due care and attention. We have received many individual testimonies regarding the benefits derived from the Institutes held thus far, and we sincerely hope and trust that every member will do what he can to induce his neighbor to join and share in the advantages it brings. The Government and our indefatigable up-to-date Superintendent have certainly done much for us in providing such a school of agriculture within the reach of all. Surely such an institution has great possibilities, and, properly conducted, may prove wonderfully effective in the promotion of good neighborly feeling as well as intelligent and profitable farming. Such an institution should be ably and loyally supported by those to whose aid it comes.

AGRICULTURAL EDUCATION.

By T. G. Raynor, B.S.A., Rose Hall.

Lately a great deal has been said and written concerning agricultural education. The time has come in the history of Canada which requires an educated peasantry. To succeed on the farm, during these times of keen competition in agricultural products and low prices, a thorough knowledge of the business is indispensable. The inventions of later years, such as the telephone and telegraph, and the improvements in steam power, have brought into existence and established a net-work of railways and fast steamships to place the produce of many countries on the markets of the world. These features have made competition so keen that the agriculturist must study how to lessen the cost of production rather than how to develop new markets To do this he must understand those sciences which bear directly or indirectly on his business. He will require a knowledge of how plants feed, of the component elements of soils, of the ralation of plants to animals, and so on The farmer of to-day also requires a business education, not only to safeguard him against the leeches in the business world, but to enable him to keep such an account of his income and outlay as will enable him to know what part of his business is paying and what is not paying. For neglecting to farm on business principles we find, not infrequently, farmers who keep a herd of six or more cows actually feeding them at a loss. In many instances cows if followed up with the weigh scale and Babcock test will be found to be eating up the profits of the better cows and certainly should lose their heads on the butcher's block. Many of the European countries have established agricultural seminaries, amongst them a number of the provinces of the German Empire,

Switzerland and England. France has even gone so far as to make the teaching of agriculture compulsory in her rural public schools. It is also claimed that the average yield of grain per acre has been largely increased as a result of this instruction. The United States have made considerable progress in disseminating agricultural information. Each State has its agricultural and mechanical school and experiment station from which bulletins containing the results of investigations in agriculture are sent among the farmers every year, and in a number of the States farmers' institutes are held Though this is a comparatively new country her governments have realized her needs, and we have the Ontario Agricultural College and Experimental Farm under Provincial patronage, and five Experiment Stations under the patronage of the Dominion Government. All of these institutions are doing excellent work. Besides these useful helps, we have a number of agricultural bulletins and reports, farm journals, and last but not least Farmers' Institutes. This latter organization may be said to have made the work at the Agricultural College and Experiment Stations much better known than before it existed. It is the farmers' college, and even time will not be able to reveal the good it is doing for the country. Our educational system of public and high schools and universities is acknowledged to be a grand one. It certainly affords educational advantages for those wishing to enter the different professions and business callings. However, the feeling is growing thut our present educational system leads from rather than to the farm. The urban population is increasing too much at the expense of the rural population, a fact which is greatly to be deplored. We are told that seventeen-twentieths of our population is either directly or indirectly engaged in farming. If this be true, should not the rural masses be educated more along the line of their calling than they are? The Agricultural College and dairy schools are doing excellent work, but they are entirely inadequate to meet the requirements of an educated peasantry. There are no feeders to keep them supplied with students as in the case of the high schools and universities The ability of the public school teacher is often measured by the success he or she has in passing entrance pupils into the high school. Little or no encouragement is given to the teacher to teach agriculture even by the trustees. Consequently little or no agriculture is taught even although it is an optional subject on the public school curriculum. The fifth form in many of the rural public schools is a thing of the past. Pupils who pass the entrance examination usually go to the high school or stay at home. A few continue to attend the public school a year or so longer, especially if there is a fifth form in the school. Then again, most of the rural public school teachers hold only third-class certificates and are not qualified to teach agriculture as they have never made it a study. I believe if agriculture were one of the subjects to be taught, which of course would imply qualified teachers, it would become the popular subject both to teach and to study. I believe, too, that if the people interested asked that the study of agriculture be made compulsory the Department of Education will make it so. In the meantime what can be done to acquaint our rural young people with a better knowledge of their business? If the trustees in rural school sections would hold out some inducement to teachers to qualify themselves to teach agriculture, by offering a little higher wages, a number of the teachers might be induced to take advantage of the summer course for teachers at the Ontario Agricultural College during their vacation. Having obtained a qualified teacher, what next? "How can I teach agriculture," says the teacher, "when I have not time to do justice to the subjects already on the time table?' Could not some portion of the Friday afternoon talks be given to agriculture? Could not compositions be asked for on agricultural subjects? Could not the attention of the pupils be drawn to the different methods of farming which they see practiced by the farmers on their way to and from school? Could not some special attention be given the pupils of the fifth form, such as directing their attention to various articles on farming noticed in the various reports, bulletins and farm journals? I believe a great deal might be accomplished in this way. An agricultural library could easily be started by collecting the various reports, bulletins and farm journals issued from year to year in this country and in the United States. Where practicable small experimental plots might be cultivated, for the purpose of observing and illustrating plant growth and culture. With the addition of a few charts and illustrations quite an outfit could be provided

for the school at a very small cost. I can see no reason why some provision could not be made in the numerous high schools for a course of lectures in agriculture, at least during the winter months. With such feeders to the Ontario Agricultural College, provision would soon have to be made for more students, and much of the time now required for teaching elementary work at the College could be turned to much better account. The Agricultural College was never so well equipped as it now is. Let us then, as farmers, make the most of our opportunities, and take advantage of all the helps we can.

THE VALUE OF THE FARMERS' INSTITUTIONS.

By W. D. McPherson, Lancaster.

We welcome the delegates here, because we feel that they have come for a good purpose, and we are glad to meet them. We welcome the Institute because through its instrumentality we are called together to receive information and advice as to the best methods of carrying on our calling with a view of increasing our prosperity. These meetings are also the means of occasionally drawing farmers together where they may profit by an exchange of thoughts, suggestions and statements of results obtained from practical experiments, which cannot fail to be of benefit to all who attend. We ought to welcome the delegates who come to us from afar, some of whom are sent out from those institutions established and fostered by our Government solely for the benefit of the farming community, and who come to us brimful and running over with knowledge obtained from experiment in and study of the best systems and methods of farming, through whom, in connection with these meetings of Farmers' Institutes, this knowledge is diffused and spread abroad, and afterwards put to practical use by farmers. I am not one of those who think little and speak disparagingly of any of the institutions of to-day, or the methods adopted in the past for the improvement and encouragement of the farmer. I have heard people say that all the efforts of the past have been failures, and that the money so used has been worse than wasted. I entirely differ from those who make these statements. It may be true that all that was expected from these expenditures has not been realized, but that they have been an incentive to and the means of improving the farmer in many ways cannot be successfully gainsayed. It is said by some that the money granted to encourage what used to be called the cattle shows in the past (now called agricultural exhibitions), the county and township plowing matches of years gone by, etc., has been so much money thrown away, and that the results for good were "nil." But if any of you who are old enough to remember the exhibitions of the fifties, the sixties, and the seventies in our counties and townships, you will find that those or their descendents who were then the most successful prize winners at those exhibitions are where you can find them to-day. They are the most successful farmers amongst us. Again when you look back and remember who were the prize winners in those days and later on at our local and provincial plowing matches, you now find them the leading farmers in our county. I believe money so spent is money well spent, whether in this direction or in experimental farms and agricultural colleges, and that there is no better way of improving the farmers than by exciting competition between them and by continuing to obtain knowledge by experiment and study at central institutions, and sending it broadcast through the Farmers' Institutes and every other practical way. But to return to my text, we ought to welcome the local talent, those gentlemen among us who take a leading part in the farming community in our county, who attend those meetings, give the result of their experience, take part in the discussions on the different questions which the addresses bring out, and thus encourage their brother farmers to adopt better methods. The general farmer will follow their suggestions, perhaps more willingly than they would follow those of people whom they may consider more favorably situated and are thus enabled to make a success of what to them might result in failure.

When we get the result of the experience of our neighbors who are to a great extent in the same circumstances, and placed under nearly the same conditions as ourselves, we take courage and go and try to imitate or even excel them. Then we ought to welcome those who come to listen and to learn. It shows that they appreciate the efforts made in their behalf by the Governments in establishing and carrying on those institutions from which so much practical knowledge is in various ways sent abroad. It also shows that they appreciate the efforts of the officers and those who assist in carrying on the work of the local organization. What is more satisfying than all else, they show, by attending these meetings, that they are seeking knowledge. To be able to run successfully in the race for prosperity in farming, we must get new ideas, adopt more modern methods, and be willing to live and learn from those who from practical experience and otherwise have already obtained the required knowledge, and, by applying it, have proved that farming may yet be made a success.

CO-OPERATION AMONG FARMERS.

By Elmer Lick, Oshawa.

This subject is one worthy of the most careful attention. In fact it is one of the questions of the day that requires the most careful looking into in order that our nation shall rise to the position to which we are entitled. The thoughts I wish to bring before you are more suggestive than complete. Co-operation means concert of action, or a number of individuals working together. By combining capital and labor immense undertakings have been carried to successful completion. In this way individuals have co-operated to build the railways, steamships, telephone and telegraph lines, canals, and nearly all of the wonderful improvements of the nineteenth century. In order to successfully co-operate, farmers must realize the need of working together. Perhaps no better illustration of this can be found than that of the common barn-raising. Every farmer knows that it is impossible for a few men to put in proper position the frame of a large barn. All are ready to assist. Another illustration can be found in threshing. In nearly all cases it is necessary to change work, or in other words, to co-operate together. Having reached the point where we can realize the necessity of co-operating, it is next necessary that there should be honesty in purpose and practice. We possibly know of instances where a first-class man has been sent to help thresh, and in return a boy has been returned. There is no honesty in such actions. Before co-operation can be made a perfect success it is necessary for us to practice the strictest honesty. There are some things that are serious difficulties. One of these is the selfishness of man. There are men among the farmers who for a slight advantage to themselves will water milk, take mustard seed with the grain to market, put good grapes on the top of a basket and inferior ones in the bottom. All such means as these ruin the reputation of our products and in consequence the sales are lessened. Another difficulty is the jealousy of men. One farmer is not willing that his neighbor with a superior article should have a higher price than is paid for the inferior article. Butter is a good illustration of this. The storekeeper buys good and bad at the same price; if he did not he would lose the custom of the poor butter-makers. The result of such a course is that there is no encouragement to produce a good article. A pound of poor butter lasts longer than a pound of good; in this way consumption is lessened and prices fall. This thought is worthy of much study. There are a few lines in which co-operation is apt to be unsuccessful. One of these is where two or more farmers use the same implement; both are apt to want it at the same time. Another is that of trading work; the most willing always does the most work. In both of the above cases the results depend on the men who are carrying on the work. In the cheese industry of our country we find the most successful line of co-operation of any attempted in our land. Not many years ago cheese were all sizes, shapes and qualities. The Dairymen's Association with government assistance went to work to educate the makers and patrons. Inspectors and instructors have been working. Uni-

formity in size, shape and quality have been striven after. While perfection has not been reached, yet wonderful strides have been made along these lines. Using the figures given by Prof. Henry, of Wisconsin, we find that the United States lost in fourteen years, export trade in cheese from $12,170,000, in 1880 to $7,180,000, in 1894, while in the same period Canada gains from $3,900,000 to $15,500,000. The lesson for us is simple. Do not imitate our neighbors across the line by making skim milk or filled cheese. The English people want the best quality they can get. If we want to supply them we must take the greatest pains to supply the best quality. In the year 1894 Canada supplied 50.4 per cent. of all the cheese imported into Great Britain. Is it not a matter for congratulation that we have more than one-half of the English cheese markets to ourselves. Yet there is a danger ahead. Other countries are learning to produce better quality and are striving after our market. If we hold our supremacy we must improve. The greatest care must be exercised by the patron in feeding, milking, and delivering milk to the factory. No such carelessness as I witnessed at a neighbor's last summer must be tolerated. This neighbor simply poured the unstrained milk into the can to be taken to the factory. The results of such a course are found at the factory in the strainer, and worse still in a decreased price owing to inferior quality. The man who deliberately takes tainted or dirty milk to the factory is a worse thief than the one who adds water, because he injures the quality of the whole product; the reputation of Canadian cheese is lessened, we get a smaller price, and run the risk of losing our trade. The time is at hand when it should not be thought dishonorable to inform a neighbor who does any of these things to cease or we will inform the authorities in order that just punishment may be meted out to the offender. The patron must continue his oversight over his milk by watching the factory, the maker and the marketing. In this way an interest will be fostered that will be beneficial to all concerned. What has just been said applies with equal force to our creameries. Co-operation along these lines has very largely increased the export of butter from Canada. There seems to be no reason why, with cheap fodders and grains, we cannot increase it very largely. The principles indicated are applicable to all our grain crops as well as in many other lines that will readily suggest themselves to the thinking man. Co-operation in the formation of beef rings has been a very successful method of furnishing fresh meat during the summer months at cost price. Usually twenty farmers agree together to furnish an animal each, the order being determined by lot. Very strict rules are usually drawn as to the nature of the animal. The weight dressed to be between 375 and 450 pounds. The animal should be taken to place of slaughter twenty-four hours before killing. It is killed in the evening and cut up by a chart early in the morning. The pieces are so arranged that each person gets all the parts of the whole animal during the season. Our ring divides the beef as nearly equally as possible. The difference in weight of beef put in and received is settled for at an agreed rate. I have not yet heard of a ring once started being discontinued. This is certainly a desirable way of securing for our country homes fresh meat at actual cost price. It makes less work in the house and gives the tired men a relish for food during the heated period. The only other point, of the many that might be referred to, which we will consider, will be various associations of an agricultural nature, such as Farmers' Institutes, Live Stock Associations, Dairymen's Associations, Fruit Growers', Poultry, Bee-keepers, and the Ontario Agricultural and Experimental Union. The leading farmers almost invariably belong to some of these associations. The object of all is to educate the farmers that they may the better grow agricultural crops in large quantities and of a uniform quality; also to point out the most economical method of producing those crops, that a profit may still remain after selling at a low price. This is a good method of co-operation, and one that is largely on the increase. Objections are sometimes taken to the expense of many of these associations. It should be remembered that immediate results cannot always be hoped for. It does appear that very large benefits have already been shown as the result of the work of the Fruit Growers' Association and Dairymen's Associations. Every farmer should become a member of his local Institute, attend its meetings, and get his neighbors to go with him. We will understand each other better; we will be better prepared to co-operate together to build up in Canada a nation of wide awake, progressive farmers, who shall produce articles in such quantities and of such quality as will command a market at

remunerative prices. Let us gather, as grains of gold, the truth that opportunity shall place in our pathway. Let us put in practice these truths. Then we may rest assured that the advancement of our calling—agriculture—shall go forward with rapid strides until the fair name of Canada shall have become a synonym for all that is good and pure. Let us have ideals of our work and country. Shall we, as a people, learn to co-operate together, that these ideals may be most certainly and more swiftly realiz d?

WHAT SHALL WE DO TO IMPROVE THE OLD ORCHARD?

Major Jas. Sheppard, Queenston.

This is a question very often asked at the present time, and like many other questions of great importance is easier asked than answered. Of late years the farmers are waking up to the importance and possibilities of the apple growing industry, and many men having orchards that have been neglected would be pleased to have information furnished that will enable them to overcome their present neglected and unprofitable state. Like a great many other subjects that the farmers have to deal with, circumstances differ, and what might be good practice for one might be very different for another, but there are a few general principles that will apply to all. The most important in my estimation is pruning. Outside of the chief fruit-growing districts, the general practice, as far as I have been able to observe, is either not to prune at all or to do what is considered a good job once in five or six years, which means that the trees are encouraged to grow wood at the expense of fruit for a number of years, and then butchered to the injury of the tree. I do not think an experienced orchardist will deny the statement that it will take less time to trim an orchard, especially of young trees, annually for five years than it will to trim it once in five years. The result of the yearly trimming is that only the wood that is wanted is grown, and the tree is saved from an unnecessary and exhausting growth, but the habit of the tree is formed. They say man is a creature of habit, and trees are very like man in this respect. Nothing will encourage the fruit producing habit in a tree equal to judicious and constant pruning.

It is useless to expect that a tree left to its own sweet will for five or six years can be properly trimmed, and its habit of growing wood and suckers checked by severe trimming. The result can be seen in hundreds of orchards that have been subject to this treatment. Five or six sprouts start for every one cut off, and if the trimming is not continued yearly the later days of that tree are immeasurably worse than the first.

Taking everything into consideration, the spring after hard freezing is the best time to do the work. Some advise summer pruning which may be all right if properly done, but it is more difficult and tedious, and coming in a busy time it is more likely to be neglected. Cultivation no doubt has much to do with the successful growing of fruit, but men have succeeded in so many different ways that it is difficult to lay down a hard and fast rule. It is admitted by most fruit growers that the orchard should not be left in sod for long periods. We often hear the statement, "I would like to plow my orchard but if I do I will tear up the roots as it has been so long since it was plowed." I do not think it would be well in such a case to plow seven or eight inches deep, but I would rather plow four or five inches deep and take the risk of tearing up some of the roots than to leave an old tough sod around the trees. Plow in the spring, sow with peas, and feed off with hogs. After a year or two of this treatment, seeding down with clover might follow, especially if you continue to pasture hogs in the orchard, a practice every apple grower should follow; it certainly is good for both hogs and orchard. If it is impossible to pasture hogs or sheep, a crop of peas or buckwheat plowed down will give good results. It is safe to say that from one-quarter to one-half of the apples grown in Ontario are of varities that have no market value. This is a great waste, and it will pay farmers well to have these unprofitable varities top-grafted with varities that are in demand for export, for it is to the export trade that we must look for our profits. Spraying is an important practice, especially on old trees which seem to be more affected with fungous diseases and insects than younger ones. Two or three applications of Bordeaux and Paris green will pay well for the cost of chemicals and labor.

OUR LOCAL MARKETS AND HOW TO SUPPLY THEM.

By W. J. Palmer, B.S.A., Toronto.

We very often hear the remark that there is an over production of all kinds of farm produce, and that the supply far exceeds the demand. This is undoubtedly the case with regard to poor and medium grades of produce, but for the finest quality of goods there has always been and always will be a good demand. There are in our cities and towns a considerable number of people who consume an enormous quantity of the products of the farm, but as the amount consumed depends largely on the quality, it is easy to understand how an improvement in quality brings about a greater demand, which in turn tends to increase prices. Take the case of cheese, for instance. The ordinary kind sold in the market is not of very high quality, and the result is that Canadians do not consume a very large amount of this wholesome and nutritious food. So soon, however, as cheese of the right quality is put on the market, viz., a moist, rich, and well-ripened article, we may expect that the sales will largely increase. The consumption of butter, honey, eggs, fruit and other farm produce, will be very largely increased in proportion as the quality increases. An efficient cold storage system, which will provide for the handling of perishable farm products and delivery in foreign markets in the best pos ible shape, will also be a powerful factor in keeping prices up in our local markets. There has undoubtedly been a drop in prices within the last few years, but as against that we have methods whereby the cost of production can be much reduced. Labor-saving machinery, cheaper clothing and groceries, and a more scientific knowledge of farm operations—all tend to cheaper production, so that the margin between the cost of production and the selling price is, or should be, as great as it ever was.

The system of trading at country stores has been a great detriment to the production of a good article, owing to the fact that the storekeeper makes no distinction but gives the same amount of goods for all qualities of produce. Every farmer who has butter, eggs, etc., to sell should make a point of shipping to some market while the goods are fresh, and where a fair cash price can be obtained. In this way, if the quality is good, he will realize a vastly better price than by trading with country stores. After considerable experience in dealing in a business way with town and city people, I find that they want things (1) Good ; (2) Regularly ; (3) At a reasonable price.

To sell well farm produce must be of nice appearance and of good quality. Many farmers seem to think that their own taste or fancy should govern that of the consumer, but they need only ship to a cash market for a short time before they find out their mistake in this respect. Every effort should be made to have the appearance and quality please the consumer, for the price received depends largely on the success of these efforts.

Then city people want things regularly. There is no money, for instance, in giving them a surfeit of new laid eggs in spring and none at all during the winter, nor is it a wise plan to agree to ship to a city dealer every week on a certain day and then fail to do so. It will pay in the end for a farmer to be prompt and to keep up a regular supply the year round.

Lastly, these people want things at a reasonable price, but they are willing to pay a high price for an especially fine article. This holds good with even those of moderate means.

Now, to refer briefly to a few of the leading farm products sold in our cities.

Butter. When making butter special pains should be taken to put it up neatly and make it look attractive. This applies when packing in tubs, crocks or pound prints. The taste is very often governed by the eye, so if the butter is attractive it will taste much better to the average person than if put up carelessly. Pound prints, neatly wrapped in parchment paper, with the name of the maker printed on it, sells best. During the fall and early winter there is also a steady demand for neat crocks or small tubs of sweet,

well-salted butter. Every effort should be made to retain the full butter flavor, and to ship to the dealer before the first bloom goes off. For immediate sale we prefer a high flavored butter that has only been washed once and then worked dry, but for holding it is necessary to wash twice. Salt from one-half to three-quarters ounces to the pound and always use a fine salt so that the butter will show no streaks when cut. Most markets demand artificially colored butter during the winter, and it is always well to use sufficient color to give a nice "grass" tint. Fine creamery brings from three cents to five cents more than the finest dairy, chiefly because it is of uniform quality and can be depended on as being fresh. To sum up, butter to bring the highest price should be (1) fresh and of good flavor; (2) neatly wrapped; (3) salted evenly; (4) colored to suit market; and (5) free from streaks or spots

Eggs. The demand for guaranteed new-laid eggs is good at all seasons in Toronto, but from November until February the supply falls far short of the demand. During that season farmers can realize from twenty-five cents to thirty-five cents per dozen for the right article shipped direct, From February on to November the price fluctuates considerably. However, if a city dealer finds that the eggs can be absolutely relied upon, he can pay a good price the year round, for it is almost as difficult to get reliable eggs through the summer as in winter, owing to the danger of their being black or containing partially developed chickens. It is not a wise thing for any farmer when he finds a nest of a dozen or more eggs to send them along with those gathered fresh. By doing this "he may fool some of the people some of the time, but he cannot fool all of the people all of the time." Eggs should be gathered daily and shipped while fresh. Unfertile eggs will keep longer and give better satisfaction all through, hence it is a better plan to keep the male birds separate from hens, except those from which eggs are required for hatching. Brown eggs will bring a higher price on some markets than those of the same size but white in color. They should be large, sound, clean and stamped with the name of the farm or the shipper. A rubber stamp and pad can be procured at a cost of from thirty cents to fifty cents. If the eggs are of fine quality and stamped, the consumers will soon demand them even if they have to pay a higher price. It should also be remembered that the shells of eggs are porous, hence it is very important that they should be kept in a clean, sweet place.

Poultry. Plump, well-fed poultry will bring a good price at all seasons, and a fancy price in early spring. They should always be starved for twenty-four hours before killing, and dry picked at once. Never scald.

Honey. The market for honey has, as yet, been only partially developed, but, owing to the attractive displays at our fall fairs, the sales are increasing, and people will soon realize its food value. Clover honey in the comb brings the highest price on any market; next comes basswood, and last buckwheat; indeed the demand for the latter is very small. Neat, even, well-filled sections will bring a considerably higher price than sections of same weight and quality of honey but bulging and rough in appearance. Strained honey sells well if put up in neat cans of from five to sixty pounds weight. It is most important that farmers should exercise the greatest care not only to produce cheaply but to market carefully, so that they may get a fair return for their labor. They should, therefore, always endeavor to sell for cash, or to those dealers only that are reliable and safe for credit.

MAPLE SYRUP.

By Erland Lee, Stony Creek.

There is as much knowledge needed in making a good product of maple syrup as there is in making a good article of anything else on the farm, yet perhaps it will and does stand as much filth at the shoe makers' hands as does any other of the farm's productions. It is a luxury, and people who buy it are those who can afford it and will have the best; therefore, those who have the best outfit and take the most pains in keeping everything clean, are able to command the highest price for their syrup. A

successful syrup maker should have everything ready beforehand. His wood should all have been cut and under cover since the former spring; his pails must be washed with boiling water before using; his sugar house ought to be large, so as not to be crowded for a place to set a pail down. It ought to have as large a ventilator as can be conveniently built over the whole length of the evaporator. It is safer to have the store room a few rods away from the boiling house in case of fire, also because of the deleterious effects of steam and heat upon the utensils. We have a patent evaporator, made by G. H. Grim & Co., Montreal, being the first one used in the county of Wentworth. It is first rate, and from its purchase we date our success in producing a fine quality of syrup. I do not say it is the best evaporator made as I do not know the merits of others, but it is first class. All our pails are covered while in the bush; this is even more important than having an evaporator. Well do I remember hustling to gather the sap when a rain storm came on, also the work entailed by having to empty the pails when the storm was over. At times there would be snow, which was even more disagreeable; and on warm days the red squirrels would race and chase each other around the trees knocking bark down into the sap; moths and flies would literally cover the sap, and on bright days the sun would discolor it considerably. I have even found mice in the pails, but as times advance evils are effaced and difficulties surmounted. All the afforesaid drawbacks are easily overcome by having the pails covered. We use dressed pine lumber of the desired width, having different sized pails, from nine to thirteen inches in diameter. Several boards are placed on top of each other, marked to right lengths, then cut with a cross-cut saw; they are painted red on one side and blue on the other, so that when we gather we change sides. For instance, if, when we gather the sap, red is up, we turn it down leaving blue exposed, thus enabling us to know when all is gathered. In places more exposed to the wind we use a few patent covers, but they are too expensive and unhandy. The Eureka spout, No. 2, is the kind we use, being the best I know of. The pail hangs directly on it, and can be turned with the right hand no matter how full, and thus emptied into the gathering pail which is steadied by the other hand, the cover in the meantime being held under the left arm. The hole in this spout, which lets the sap out of the trees, is very small, and is so placed that the sap covers it, thus excluding the air which tends to dry up the wood. The spout is driven into a three-eighths inch hole in the tree, which has been bored into it to a depth of about one and one-half inches. The sap is gathered in a large wooden tank, perhaps galvanized iron would be better. Its head is about six inches from the top and has a circular lid in the centre large enough to admit a pail easily. When the tank is full it is driven up an elevated driveway, and the sap runs out from the bottom of the tank, by a three inch hose and pipe, into the store tank which holds about fourteen barrels and is made of galvanized iron. This is placed outside of the boiling house, being connected with the pan by one inch hose. It has a tight cover, and is placed higher than the evaporator, thus preventing the necessity of dipping, which injures the sap. The sap is never handled after it is poured into the gathering tank until it comes out of the evaporator as syrup. There is a regulator connected with the evaporator that regulates the depth of sap in the pan. In firing, it is necessary to place the wood loosely so that the flames may flare up through it to the corrugated bottom of the pan. Start to boil the sap as soon as there is enough, and keep the evaporator going at its fullest capacity until you are done, for every hour the sap stands it becomes darker and makes a darker grade of syrup. It is boiled down to syrup in the evaporator without removing the syrup or slacking the fire. When it is nearly syrup there would be danger of boiling over, but there is a damper under the last pan that turns the heat into a sub-flue and thus prevents the syrup from running over. We have a thermometer standing in the last or syrup pan all the time, and when it rises to 219° we draw off, letting it drain through a felt strainer, which takes out all impurities except a trace of lime. We then test the syrup with a saccharometer which should register thirty-two, and when cold thirty-six. The syrup retains a better flavor if canned immediately, though there may be a trace of lime settle in the bottom of the can. The lime that sticks to the bottom of the syrup pan can be removed by changing the pans: when sap is boiled in the syrup pan the lime loosens. The three back pans are each two by three feet across Once every day or

every two days will be often enough to change. The sap is conducted from one pan to another by means of siphons, which do not draw from the top of the sap nor yet from the bottom, so that no sediment or scum is conducted back. We have used milk and the whites of eggs to cleanse the syrup. There is very little impurity left that cannot be taken out with milk. It is a good idea to have all cans stenciled with your name and that of your farm. Only sell first class syrup as first class; if, because of hot weather or late season, you have dark syrup, sell it as second class distinctly Your customers will soon learn to trust to your classification. Have your syrup uniform, neither too thin nor too thick.

If you desire to make sugar, the thermometer comes in again. Soft sugar boils at 235°; 252° will make dry sugar. By knowing the kind you want you can regulate it by the thermometer. Twenty cubic inches will be about the size of a pound of sugar; in making your mould this will give you an idea of size. The authorities, I think, should take some action to prevent or discourage the manufacture of adulterated maple sugar and syrup. Every can of syrup that is adulterated ought to be labelled showing the amount of adulteration, and any deception ought to be punished. The sugar makers should have the same protection as regards adulteration as have the butter makers.

HOW TO MEET LOW PRICES.

By Col. O'Brien, Shanty Bay.

That the farming interest is at this very moment in a very dependent condition cannot be denied, and that this depreciation is mainly due to the low prices of agricultural produce is equally indisputable. There are, no doubt, other causes which contribute to the general depression While it is true, as often alleged, that the principal articles of general consumption, as well as those specially required by the farmer, can be purchased more cheaply than they could many years ago, it is equally true that this advantage is offset by the more expensive habits to which our farmers and their families have become accustomed. Many things formerly deemed to be costly luxuries are now considered to be necessary to comfort or convenience; and while the older men and women amongst us, who have undergone the trials and privations incidental to the life of the early settler, may still be content with the frugal habits of former days, it is not so with the younger members of their families. That everything which tends to promote the comfort of the farm house, and therefore the contentment of its inmates should be encouraged I fully admit. And beyond mere comfortable surroundings we should aim at refinement of pursuits and cultivation of mind, which are perfectly in keeping with the cheerful performance of even the most laborious and disagreeable work of the farm. But neither refinement nor cultivation are dependent upon the lavish expenditure of money, nor are they often promoted thereby, and the line should be carefully drawn between the outlay necessary for such desirable objects as promote the true welfare of the household and mere expensive habits which grow by indulgence, causing discontent and incapacity for the steady employment and seasonable pleasures which life on the farm affords. The consideration of this subject leads to another cause of depression not entirely of a financial character. Into the causes which lead so many of our young men to leave the farm I do not now propose to inquire, but the result of their doing so not only leaves the farmer more dependent upon hired labor but takes from him the interest that he would otherwise feel in his work, and the stringent motive to pursue it with diligence and energy. A father and sons working together upon the farm, upon whatever terms of partnership or mutual interest they may agree, can afford, in times of depression, to wait for better before dividing their shares or counting their profits. But the hired man must have his wage whether times are good or bad, and whether the farm has yielded it or not. He will not and cannot afford to wait, and the grain or the cattle must be sold, no matter what price they may realize, in order that his demands may be satisfied; and the farmer, besides thus suffering in pocket, naturally asks himself this pertinent question, "What is the use of my toiling

and milling—of my striving to improve this property when there is no one that I care for to enjoy it after I am gone. I had better make all I can of it while I live, and not trouble myself about the future." I do not know of any sight more touching than that of an old couple who, after enduring all the toils, trials and privations of clearing a farm, putting their life's work into making a comfortable home and a valuable property, are deserted by those for whose sake mainly all this work has been done and their hardships endured, and dependent in their old age upon the hired labor of strangers.

The main cause, however, of our present depression is, as I have said at the beginning, the low price of our produce; and how that difficulty is to be met is the great question which we have to consider. I have already spoken of outlays which should be carefully regulated, some of which may be dispensed with altogether, and others which there seems no way of avoiding. There are, however, methods of economy which the farmer has within his own control, and which come under the head of cost of production. It is clear that if we can reduce the cost of producing a bushel of grain by one half we should have an equivalent for the reduction of price in the same proportion. This, no doubt, it is beyond our power to accomplish to such an extent, but it is possible at any rate if not to reduce the cost at least to prevent it from going beyond a necessary limit. A binder costs, we will say, one hundred dollars. With care and attention that binder will last for ten years, so that its annual cost is ten dollars, and if it cuts five hundred bushels of grain in a year, the cost of cutting per bushel would be two cents; but if through carelessness in working, or from not properly protecting it when idle, the binder only lasts five years. so that the annual cost is twenty instead of ten dollars, the cost of cutting becomes four cents instead of two, and the same rule and the same principle will apply through all the operations of the farm. This is economy in the cost of production which it is in the power of every farmer to practice. It is obvious, however, that similar and much greater returns may be obtained if, without increasing the cost, we can increase the amount of production. If, by improved methods of cultivation, we can make the acre which grew only fifteen bushels of wheat grow thirty, we shall be nearly as well paid if in the latter case we sell for fifty cents per bushel as if in the former we sold for a dollar. And the same rule will apply to every other kind of produce, whether from the field, the dairy, or the orchard. The farmer may, perhaps, be sanguine enough to think that without any such effort on his part he may yet be as well off as formerly—that, as we say, "times will improve,"—prices will rise and consequently property advance. This I venture to say is a false hope. I can see no ground whatever, in the ordinary course of events, for any such expectation. It is possible that a European war of magnitude and duration may raise the price of wheat for a time—that some other calamity may cause a scarcity and consequently greater value for cattle. It is possible—nay, even probable—that a great increase in the production of gold, or some other change in the currency, may cause a proportionate increase in the relative value of food products. All these and many other events are possible, but are they contingencies upon which a prudent man would rely for success? The time will come, and that before long, when the United States will no longer have a surplus of grain for exportation. The Eastern States have long ceased to grow enough for their own consumption, and the population of their great cities is rapidly increasing, requiring every year a larger share of the surplus of the west. It is within the memory of many here present when the Genessee Valley was a great wheat-producing country, and when Rochester was the centre of the trade in wheat and flour. That centre has rapidly been moving westward, until now the extreme limit of the wheat-growing country has been occupied. States which were great producers of wheat are now given up to corn, cattle and hogs. Numerous cities with vast populations, all consumers of bread and meat, are growing up. There is still, no doubt, a large surplus, but the home demands upon it are daily increasing, and the time will come when the manufacturing population of those cities will be clamorous for the free admission of those food products with which Canada can readily supply them. But while this process is going on in the United States, fresh fields for the production of grain are being developed elsewhere. South America, which has just begun to enter into competition with us, has an enormous area of wheat-producing lands as yet undeveloped. India is constantly increasing her production, and whatever wheat she produces is for export, wheaten bread

not being the food of her people. Even in Africa there are vast tracts of table land which, some day or other, will produce grain which will come into the markets of the Old World. And what of our own Northwest in the meantime? If Manitoba and the Northwest, with a population of only a few hundred thousand, could, in 1895, raise thirty million bushels, what should those provinces not do when their farming population is reckoned by millions. In fact the wheat-producing lands are not only so extensive in particular countries, but so scattered all over the globe, that nothing short of so very improbable a thing as a general failure can cause such a general scarcity as to affect the price. Take this year, for example, with a famine in India, a failure of the crop in Australia, and no very large production anywhere, the price of wheat has risen to eighty cents per bushel, and there it seems to stay, while the price of all other grains is so low as hardly to pay for the cost of production.

Speculation, however, as to the future, interesting though it may be, is of little avail as regards the present necessity. It is with that only that we need now concern ourselves. I have already pointed out how, in some respects, we have added to the difficulties of our position, and how we should act in order to reduce them. But something more than economy in expenditure, or reduction in cost of expenditure, is necessary to meet the present conditions. All that can be done in these directions should be done, but the most effectual means is to increase the quantity and, where possible, the quality of production. To grow two bushels of grain where only one grew before, to churn two pounds of butter where only one was obtained before, to make two pounds of beef or pork at the same cost that was required for one, to cut two tons of hay from the meadow from which only one was cut before, to take one thousand bushels of roots from an acre of land instead of five hundred—all these, and many other things of a similar nature, should be the objects of ambition by the farmer of Ontario, for thus, and thus only, can he expect to meet the difficulties of his position and solve the problem of how to meet low prices.

But can this be done, and, if so, how is it to be done? Not perhaps to the extent of doubling our production, but that our production can be largely increased, there is no doubt. We all know of exceptional cases among our neighbors, of whom it is said that they are very lucky, they always have good crops. Is it luck, or is it not that they are better farmers than ourselves who are less fortunate? There are undoubtedly great differences in the fertility of different farms, but there is no soil that has not some advantages of its own, and it is not always upon the best lands that we see the best crops. Every variety of soil requires special treatment, and the best test of good farming is to know what that treatment should be. But, be the result large or small, it is manifestly in our interest, and should be our desire to make the most that is possible out of our land, and to find out the method by which that can be accomplished. And in this respect we are much more fortunate in these days than any of us were a few years ago. Not only have scientific researches been applied to the subject of agriculture, but the results of that research have been brought into practical form and made available to every man who is willing to learn what they teach. By means of the Agricultural College at Guelph instruction in the theory as well as the best practical methods in agriculture is brought within the reach of every young man who wishes to learn all the most improved ideas and practices. The experimental farms established by the Dominion Government send forth freely all the information that science can give us respecting the nature and value of the various crops that we grow, as well as the results of carefully conducted experiments as to the best means of raising them. These institutions also teach us the feeding value of the different kinds of grain, and of all the other substances that we use for the production of meat or dairy products. We are are also taught the exact value of the different manures, as well as the best methods of applying them to the soil. Important and very useful information is given us with regard to the numerous enemies, in the shape af insect pests, that attack our crops, the parasites that destroy our fruit, the fungus growth that rots our potatoes and smuts our wheat. New varieties of such are continually being brought to our notice, after their value has been tested by the most carefully conducted series of experiments. In short, there is no department of agriculture upon which light is not

being thrown by scientific research and practical experiment, and the knowledge so gained is accessible to all who care to take advantage of it. That every farmer can fully avail himself of the information thus given is not perhaps to be expected, and, as the conditions under which the farmers labor are scarcely in any two cases exactly alike, there can be no universal application of any given rule. The physical and mental qualifications which the farmer brings to bear upon his work vary as much as the qualities of the soil which he cultivates, and the extent of his capital, whether in the shape of money or in the capacity for labor possessed by him and his family, will also largely influence the nature of his operations. Fortunately, however, whatever these conditions may be, there is room for their application either in the general work of mixed farming, or in any of those numerous special branches for which the farmer may have special aptitude or special advantages. The rule, then, seems to be the application of general principles under the guidance of local conditions and personal experience. The principle, based upon the law of nature, cannot vary, but its effect under certain conditions will vary as much as the conditions themselves; and it is the nature of these conditions and their effect upon the application of the principle which the farmer must study in order that he may get the largest return for the expenditure of his labor and his capital.

Let me briefly sum up a few of the ways in which money may be wasted, and, on the contrary, saved; the pressure of low prices increased, and, on the contrary, relieved. In the breeding of stock it is waste to save money in the service of the male animal; it is economy and a source of profit to obtain the best suitable to our conditions. It is waste to save money by letting our stock live through the winter on the outside, around a strawstack; it is economy and a source of profit to house them well and feed them well. It is a waste to feed cattle upon straw and sell all hay and grain; it is economy and a source of profit to convert these articles into meat to sell and manure to make our fields more fertile. It is waste to buy expensive machinery and leave it exposed to the weather; it is economy to keep it under cover and in good order. It is waste to leave our stock to the care of the chore boy, or the man that we engage for the winter for his board; it is economy for the farmer to look after it himself, and see that the food is carefully and economically given, the stables kept properly clean, and the condition of the animals closely watched. In short, it is economical and profitable to keep expenses within one's means, and avoid speculation; to convert the raw material of the crop into the finished article of beef, pork and mutton, and butter and cheese, for the market, and manure for the production of still better crops, and thus to attain the desired end of meeting the pressure of low prices by economy of method and increase of production.

FARMERS' NEEDS.

By W. S. Fraser, Bradford.

This is a broad subject and may be approached from different sides. Although I do not expect to fully compass it, yet I hope to be able to call attention to some things which we, as a class, need. It was thought at one time that all a farmer needed to succeed was physical strength with great powers of endurance and willingness to work. This was true to a greater extent in the past than it is now. Time has wrought changes not only on our farms but in our conditions. The pioneer work with its many hardships has passed into history, and we often hear those who bravely fought the difficulties of the early settlers speak of the farmers of to-day as having no difficulties compared with those with which they had to contend. We know that our difficulties are different from theirs, but are ours more easily overcome? In the early days the land was more productive, prices better, taxes less, weeds fewer, almost no insect enemies, climate less severe, habits of living simpler and less expensive, and the steady increase of values very encouraging. To-day we have to compete with the world; countries that a short time ago were

almost unknown are to-day shipping large surpluses to the same markets as we are. Our land is less fertile, weeds and insect foes are multiplying rapidly, while more advanced civilization, with its many advantages and increased cost of living, makes demands upon us that were unknown to our fathers. It has ever been that each generation has difficulties peculiar to its own time. It is necessary that the intelligence of the people be applied to their present needs. In the first place the farmer of to-day needs a broad knowledge. We know of no profession or occupation that requires of those engaged in it a broader knowledge than is needed to make a successful farmer. He needs to know a good deal about the soil, its composition, character, and conditions. On the same farm he may have different kinds of soil requiring different treatment. If the conditions are not right he must know how to make them right; if it be drainage it needs he must know how to do it successfully, cheaply; if it be deficient in some element of plant food he must know the best courses to pursue to supply the deficiency. He needs to know the way to till his land so that it will produce to its utmost capacity. He must know the cultivation most suitable for each crop to bring it to its highest state of perfection. He needs to know the nature of the different crops, their habits, and how to handle each and every crop that he may cut and cure them all in a way that will secure the best quality of grain or fodder. Take for example the clover crop, which is, perhaps, the most important the farmer grows to day (yet misunderstood by so many), and the corn crop, the next most important. We know that treatment suitable for the one would be most unsuitable for the other. So it is with all the others; as one differs from the others, so does the treatment best adapted for one differ from that of the others. He must know what his crops take from the soil that he may arrange a system of rotation that will best increase the fertility of his land; he must know the varieties most suitable for him to grow, and how to obtain them without being imposed upon by the many frauds practised upon farmers.

Nor is this all that a farmer needs. "Plants out of place are weeds," etc. The number of these in many places is rapidly increasing; new kinds are appearing from time to time which necessitates his studying their nature and habits of growth that he may the better be able to eradicate them. He also needs to know the different kinds of implements and farm machinery which he requires; their values and suitability to his work; that he is not at the mercy of agents He must know how to operate and keep them in repair and see that they are kept under cover when not in use. The farmer may be considered as a manufacturer, for present prices of coarse grains and hay will not warrant his disposing of them in the raw state; he must manufacture them into finer products, and in the transfer from the vegetable to the animal kingdom he must know the animals' individuality, which are the machines he uses, and the best rations to produce pork, beef, mutton, dairy produce, etc. To do this successfully he needs to cultivate the market value of raw materials, and also their food and manure value. He must follow the practice of successful manufacturers, turning the by-products to the best account, and looking closely after the details. I would like to emphasize this, as many farmers attempt to feed and their ideas are so vague and methods so unsuitable that it is impossible for them to make any profit on the present small margins.

In the second place the farmer needs to apply business principles to his business. He should take stock at least once a year, and keep strict accounts, that he may know where his money comes from and where it goes, whether he is making anything or not. He requires to calculate each branch of farming closely to ascertain whether it be profitable or not. I may say that all of the implements necessary on a farm there is none more useful than a lead pencil, and when well used will assist him wonderfully in knowing what he is doing. Many farmers go blindly on from year to year not knowing their financial standing until it is too late, when they are astounded to find that they are not able to pay all they owe, while this state of affairs might have been avoided had they kept accounts.

In the third place the farmer needs to practice economy—not in the narrow sense of looking after the dollar alone, but in the broader sense, including the resources of his farm. We often see portions of land on farms worse than wasted, growing unsightly weeds, whereas by clearing away these nuisances, straightening fences and doing away

with unnecessary ones, draining wet portions, and other ways, the profits may be much increased. Our time and energies should also be economized by doing work at the proper time, and systematically planning our work and working our plans. We know that there is great need for more economy in caring for our implements, in the operating of them to see that they are in proper condition to do the work easily on themselves and horses, that they be well oiled and carefully looked after and housed when not in use. Implements and farm machinery when left lying exposed to the weather is a wilful waste which no farmer can afford. When we look carefully into the whole situation, we may be justified in saying, who is sufficient for these things? Where are we to obtain the knowledge necessary? It is within our reach, even at our doors We get knowledge by engaging in the work; we learn from the experience of one another; our Institute meetings are places where we can learn a great deal. In the discussions there, the subjects are criticized closely, and much light is brought to bear on the questions discussed. All may contribute to a common fund, and at the close each may carry all away. Nor is this all; for the small sum of twenty-five cents we may become members of the Institute for one year, during which time there is sent to our homes reports of the following important associations: Dairymen's, Creameries, Dominion Sheep Breeders, Swine Breeders, Cattle Breeders, Good Roads, Poultry,—each and all of these contain the very latest information along their lines; the report of the Ontario Agricultural College, which is interesting and instructive; the report of the Experimental Union—the work carried on by Mr. Zavitz with which every farmer should be familiar, as it furnishes us with the most reliable information regarding all of our crops, the relative values of many different varieties as tested in an impartial way; each and all of these reports and bulletins, issued from time to time, are sent to homes of members where they may be perused at leisure and kept for reference, are mediums through which we may gain a great deal of knowledge which we cannot afford to do without, and, thanks to our Institute system and government assistance, are within reach of us all. We have our agricultural journals, which members may secure through their secretary at small cost, and which are ably edited by men who know whereof they write. Another way by which we may learn a great deal is by visiting well conducted farms, comparing notes, and enquiring into that which we do not fully understand; excursions to the Ontario Agricultural College, where we may examine the implements, stables, dairy, and different breeds of stock, and get information on each and all of them. We would like to see young men, who can at all afford it, take a course in this college. They will be better equipped by the instruction they will receive there for making a success of farming and filling their places well in the world than they would by adding to their capital the small amount it would cost them It is an institution which many do not appreciate at its true worth, from a prejudice that scientific knowledge is of no use to a farmer, and that there are none of the staff who know anything of the practical work on the farm—that there is no danger of the boys becoming idle and demoralized. The moral tone of this institution is second to none in the Province. The President, Dr. Mills, is a man well acquainted with every phase of farm life, having made his mark as a practical man before he began his studies, and has always kept in touch with farming. He takes a fatherly interest in the boys, and if any of them neglect their work he uses every means to induce them to do better, and, if he does not succeed, will notify the parents. The rest of the staff are also deeply interested in the welfare of the students. The boys' associates are better than are found in very many cases on the farm at home.

In the fourth place, farmers need to deal with the question of their boys leaving the farm. This is a problem that has puzzled many. Let us look at it from a boy's point. In may cases he sees nothing but hard work, no pay, and poor prospects. In such cases we cannot blame boys for trying to better themselves. But many farmers who are able to do well for their boys keep them working long hours, give them so little time for anything else but hard work that they feel but little better than the horses they drive. They see boys in town who work shorter hours using money of their own. They see the hired help on the farm receiving each year an amount that seems to them a small fortune. The professional man's duties seems to them mere play for which they receive good pay, and so they look at their own life in its worse aspect, and

look at other people's through rose-coloured spectacles. They become discouraged; will work at almost anything rather than farm, and as B. B. Osler, Toronto, puts it, "Leave the honest farm for the wicked city," where each year numbers are ground up morally and physically.

We need to make our farms as attractive as possible and make things pleasant at home. We should have a good supply of good literature for them to read. We should give the boys some interest in the farm; a piece of land for them to manage and have the profits for themselves; or some young animal which shall be their very own, not as in many instances, "Johnnie's pig but dad's pork," and if we calculate how much a year it costs to clothe and educate each one and divide by twelve we find how much per month, and to every boy and girl over twelve years of age give this amount monthly, and give them to understand that they buy their own clothes and bear their own school expenses, and keep strict account of all transactions; we thus set them up in business in a small way, and inspire them with an ambition to turn things to the best account. This teaches them the value and the use of money and how to keep accounts, and they will economize in ways they never thought of before and will save money on the amount their parents would have to spend on them. They are more satisfied with their lot, and it gives them an independent feeling. It is also a good education in how to manage when the heavier duties of after life rest upon them. We often see young people when starting life for themselves wreck their fortunes in a short time. Usually they are found fault with for bad management. It may be that they never had five dollars of their own before in all their lives. Now who is most to blame, they or their parents? Would we not be morally responsible if we were to start a man who had never driven a horse out on a rough road with a lively team? Would we expect anything else than that he would have a smash up? Is it not necessary that young people should have a training in doing business as well as in driving horses? We know that our country's welfare is largely dependent upon the farmer. As the farmer succeeds the country prospers. The competition is becoming keener every day. The law of the survival of the fittest will decide the matter. Let us feel the force of the proverbs, "Knowledge is power," "Economy is a virtue," "Industry is a virtue and unity is strength." Let us not strive against one another but for the advancement of the whole. We glory much in the military achievements of our ancestors whose swords are now turned into ploughshares and spears into pruning hooks, but let us be possessed by their courage and skill in the use of these implements, thus helping to make Canada known in the markets of the world by the excellence of her products and her sons and daughters stand in the foremost ranks of agriculturists.

FARMING, PAST AND PRESENT.

By A. J. Reynolds, Danforth.

Agricultural operations present a wider field for inventive genius and scientific research than any other occupation allotted to man. Husbandry is at the head of human arts, and is the source of wealth and existence. Every material thing, except air, comes from the earth—necessities, luxuries, everything. The farmer, like a good physician, simply assists nature. The ambition of many city men is to accumulate sufficient wealth to retire from the whirl and strain of active business in the fevered city and build himself a home in the country. The true farmer's ambition is to own the best cultivated farm and the finest stock in his county. Since the prosperity of a nation depends upon the development of its agricultural resources, the one advancing with the other, and since the very existence of the human family depends upon its yeomen, the farmer who does not realize the importance and greatness of his calling, who is unwilling to acquire the knowledge necessary to success, had better try some other employment. A man to succed must be proud of his avocation or he fails to obtain the best results. The farmer should have a thorough acquaintance wtth the plants and animals capable of ministering to human

necessities and comfort. He should have a fair knowledge of botany, that he may interpret the silent language of the vegetable world around him—that he may become acquainted with each plant with which he deals, knowing its peculiar necessities and the various methods employed to improve and care for it, thus obtaining the greatest returns from the least outlay of labor and money. In accomplishing this he deals largely also with chemistry, whether conscious of it or not. By this interesting science the mysteries attending the transition of plant life from inert matter to leaves, buds, stems, flowers and fruits, are made intelligible. Every business must be learned, and the more thoroughly the better.

To observant people it is manifest that a healthy re-action has been going on in the popular mind regarding the pursuit of agriculture. The evils produced by the overcrowding of other occupations are beginning to be appreciated and farming to be dignified by the light which science is shedding upon it. To be a good farmer now requires more than mere unenlightened patient drudgery. The calling demands knowledge, constant study, patient experiment and tireless industry. The farmer feeds the hungry of all classes; he deals in commodities which must be purchased. He is the most independent man of the present age. There was a time when a successful struggle for simple existence satisfied the tiller of the soil; but science, with her schools and colleges, railroads, telegraph and steamboats has made vast changes. The glitter and tinsel of cities, the imaginary honors of the professions, the apparent ease of accumulating wealth in commercial pursuits on the one hand, and the snail-like, hum-drum, hard-work life on the other, have driven many young aspiring men to forsake farming for some more progressive occupation. No avocation in life is more exalted and pleasurable, and no other is more scientific if properly pursued—not one is more conducive to health and happiness; no calling will tend to unfold more fully the whole capabilities of body and mind, or to deepen convictions of an all-wise Creator. But to succeed at the present time, he who engages in it must listen to the teachings of science and experience as recorded by wiser men than himself. Then, with sound judgment and an honest pride in his calling, the farmer may exalt his avocation, and in turn be himself exalted. The son himself will gladly follow in his father's footsteps, and the daughter will delight to grace the home of comfort and happiness on the farm. To make farm labor honorable, pleasant and profitable, by making it intelligent, should be the aim of every true Canadian farmer. The farmer must do his individual part in meeting the world's demand upon his country. In no way can this be done to better advantage than by storing his mind with knowledge bearing upon his calling. Since the object of human labor is to bring enjoyment, the sooner the farmer learns to accept every advantage offered him the sooner will rest and comfort come to him.

We are all blessed in this Canada of ours with a generous soil, healthful climate, and water pure and plentiful. While there may be much to discourage the farmer, there is also much to encourage him. While we cannot control the prices of our commodities, as that depends upon supply and demand, we must endeavor to increase our productions as well as lessen the amount of labor. Nothing gives more evidence of thrift and enterprise in farming than keeping everything in order. At the cost of a little time and labor the appearance of an untidy farm may be so far improved as to add considerably to its value. Enterprising and intelligent farmers are always experimenting, and results find their way into agricultural reports and periodicals. If profits can be derived from these experiments we may share them without the risk of labor, time and money originally expended; or knowledge of others' failures may save us from making the same mistakes. A farmer who does not read cannot in the true sense become successful. The farmer who reads most knows most, other conditions being equal.

It is a farmer's privilege as well as duty to become a member of an Institute. By so doing he is in a better position to receive aid from attending its meetings and taking part in the discussions which take place. He also is entitled to receive the various reports and bulletins bearing on agricultural topics. Many of these contain most valuable information worth many times the small expenditure necessary.

BIRDS IN RELATION TO CROP PROTECTION.

By W. Brodie, Toronto.

Birds have been in all ages objects of interest to tillers of the soil and to keepers of sheep. Many obvious reasons have been suggested for this, presenting two principal aspects, the ethical and the practical. The ethical aspect is not usually estimated as highly as it should be, for the presence of beautiful, graceful and appropriate things, as birds are, always tend to elevate the higher mental and moral qualities of men. No forms of life possess these ethical characters more eminently than birds. Human life without any appreciation of the beautiful is not properly human life but mere brute life; and things graceful and beautiful are appropriate around every farm homestead. Most attention has been given to the practical aspect —birds in relation to the protection of farm crops from plant-eating insects. The protection problem is a very complicated one, and for its satisfactory solution we require much more accurate information of the life history of many insects than we now possess. The protection of farm, forest and garden products is one of great magnitude. It is estimated that over two million dollars' worth of products is annually destroyed in Ontario by plant-eating insects. It is not too much to say that this is a most culpable waste, which could and should be prevented to a large extent. For the present set aside the consideration of many artificial methods of destroying injurious insects which have been more or less successful, such as hand-picking and poisoning, and and consider the influence of bird life in the general problem of plant protection. Reproduction in plants and insects is much in excess of the requirements of a mechanically balanced system, so much so that nature has been accused of extravagant waste. Tennyson falters when he finds that out of fifty seeds she often brings but one to bear; but the proportion of apparent waste is very much greater than this. The utility of plants, insects, and of higher life forms also, in the economy of nature is simply to eat and be eaten, and so numerous are specific life forms and so intricate and complicated their inter-relations that this seeming waste of life energy is an absolute necessity to the continuance of individual as well as of specific life. The principal problem presented is that of food supply. Plants require suitable soil in which to grow; insects require suitable plants on which to feed. If the struggle for existence were confined to plants alone, the hardier and more prolific plants would soon overshadow the lesser and weaker and push them out. But plant-eating animals come in as a complication and a balancing up power; and among plant-eating animals insects play an important part, for if there were no check to the increase of plant-eating insects, vegetation would very soon be swept from the face of the earth. Insect parasitism comes in here, and if the struggle was simply between plant-eating insects and their parasites, plant-eaters would soon cease to be. In nearly all cases of insect parasitism the larvæ—the grubs, the young—of the parasites live and feed inside the larvæ—the caterpillar—of leaf-eating species. One caterpillar may contain fifty or more young parasites. Almost every species of leaf-eating insect is the prey of several species of parasites. The Tussock moth has twenty-one. Over six hundred species of these insect parasites occur in Ontario, and the power wielded by them in the economy of nature is of very great magnitude. But here secondary parasitism comes in as another disturbing element. These secondary parasites prey on the primary parasites, a complication altogether favorable to the increase of plant-eaters. And this is not all, for there are tertiary parasites which prey on the secondary parasites and are antagonistic to plant-eaters. And then on the arena of this strangely complicated contest of insect and plant life, insectivorous birds come in as a disturbing and also a balancing up power. Now, as nearly all our insectivorous birds prey indiscriminately on insects, injurious and otherwise, in order to estimate the economic value of birds with any degree of accuracy, we would have to strike a balance between the number of injurious insects they destroy and the number of beneficial, for while a bird is destroying one plant-eating caterpillar it may at the same time be destroying fifty primary parasites It

may be said that birds when preying on mature insects and not on their larvæ are directly beneficial, and when preying on primary parasites or hunting hymenoptera they are injurious. It may be said also, that birds when preying on plant-eating insects—larvæ or imagoes—rarely parasitized, are directly beneficial, but when feeding on larvæ —caterpillars—usually parasitized, they are injurious. Again it may be said that birds when feeding on the larvæ of plant-eating insects in which the secondary parasites are the most numerous, are directly beneficial. Generally it may be said that birds when destroying plant-eating insects in any form, while not at the same time destroying either primary or tertiary parasites, are directly beneficial. The most important function of bird life in the grand operations of nature is to secure the continuance of existing specific forms in an average uniformity in the ever present struggle for existence. For this, and for many other reasons, bird protection should be the care of every resident on every homestead in Ontario.

REPORT

OF THE

PROVINCIAL INSTRUCTOR IN ROAD-MAKING

ONTARIO

1896.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

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REPORT

OF THE

PROVINCIAL INSTRUCTOR IN ROAD-MAKING.

To the Honorable JOHN DRYDEN,

Minister of Agriculture :

SIR:—I herewith beg to submit to you my report for the year 1896 on Road and Street Improvement in Ontario.

The scope of this report is necessarily confined largely to a general review of the situation rather than a detailed statement of the work in which I have been engaged; this for the reason that, my duties being of an educational nature, and the office having been created under an Order-in-Council bearing the recent date, April 15th, 1896, the period has been too brief to anticipate any radical effect upon methods which have held for nearly a century; for the further reason that, while much literature relating to road improvement in England, France and the United States has been laid before the people of Ontario by the public press, little or none of a distinctly local character has been available. and a discussion of the subject in a manner applicable solely to this Province will therefore be of value and interest.

I have the honor to be,

Sir,

Your obedient servant,

A. W. CAMPBELL,

Provincial Instructor in Road-Making

DEPARTMENT OF AGRICULTURE,

TORONTO, Ontario, 23rd March, 1897.

PROVINCIAL INSTRUCTOR IN ROAD-MAKING.

INTRODUCTORY.

The improvement of roads in Ontario has not kept pace with the development of the Province in population, wealth, civilization nor commerce. This lack is seriously felt by all classes of society, and has, within the past three years, created an almost revolutionary movement in favor of better roads. Were economic methods instituted, millions of dollars would be added to agricultural values, and the mercantile and banking interests would be placed on a more stable basis. This movement is not confined to Ontario alone, of the Provinces of the Dominion, but is already beginning to take definite form in the others, especially Quebec, Nova Scotia and New Brunswick.

During my tenure of office, I have found the towns even more in need of reform in matters relating to street improvement, than are the rural communities, and they have been quite as ready to receive instruction. It should be understood throughout this report that streets of towns are quite distinct in very many particulars from country roads, and that the curbing, boulevarding, width of macadamized driveway and other features advocated for town streets are not applicable to township highways.

Procedure.

In the performance of my duties, the procedure has been, upon receipt of a request for my services from a township, county, town or city council, to appoint a date upon which to visit the municipality. Accompanied usually by members of the council, the Board of Works, or a deputation, I drive over the roads or streets, and point out defects in their construction and maintenance. I further examine the material available for road-making, the system of expenditure, and the administration of road laws. Having made this investigation, and informed myself as to the lines along which reform is most needed, I deliver a public address on the subject, directing my remarks, however, more particularly to the members of the council. Subsequently I present to the council a written report upon the condition of the roads and streets examined, the material available, etc., etc., with recommendations as to the best methods and systems to be adopted. These local reports I find necessary in the great majority of instances. Oral instruction merely, particularly on technical points, is misconstrued, overlooked or forgotten to such an extent as to render a written statement of the greatest value in securing substantial results. They form also a record for succeeding councils. Two of these reports are appended to this volume, to show the ground covered by them—one for a town, and the other for a township municipality.

Municipalities visited in this way up to the end of 1896 were:

City of Stratford.

Towns and Villages.

Cobourg,	Orangeville,	Barrie,
Arnprior,	Brighton,	Port Hope,
Ingersoll,	Carleton Place,	Cornwall,
Winchester,	Iroquois,	Morrisburg,
Pembroke,	Galt,	Newmarket,
Seaforth,	Clinton,	Woodstock,
Berlin,	Paisley,	Paris.

Townships.

Beckwith,	Hamilton,	York,
Matilda,	Mountain,	Winchester,
Williamsburg,	Finch,	Osnabruck,
Roxborough,	Cornwall,	Kenyon,
Charlottenburg,	Lochiel,	Lancaster,
Pembroke,	Tuckersmith,	Stanley,
North Norwich,	Cavan,	East Nissouri,
Elderslie,	Greenock,	East Zorra,
West Zorra,	Puslinch,	Hallowell.

Interest Taken.

In consulting with municipal councils, and in publicly discussing the question of road reform, the interest displayed has been most gratifying, and promises, in due time, the most satisfactory results. My attention has been directed to a number of instances of actual road construction in which improved methods have already been adopted with beneficial effect, as a result of the distribution of literature on the subject

Public sentiment has been awakened with regard to the matter, and in every district of the Province I find the keenest interest taken in the discovery of ways and means whereby the neglected condition of roads and streets may be overcome. In every locality visited, my instruction has been met by an evident intention to carry it into practical use in the improvement of the highways.

Machinery Exhibit.

At the Industrial Fair, Toronto, in September, 1896, an exhibit of road-making machinery was arranged, and attracted a great amount of attention. It is intended to continue this exhibit in succeeding years, as it affords municipal officers and others interested in road-making an opportunity to learn not only the importance of using modern implements, but to see the different makes in actual operation, side by side, assisting in the selection of a pattern that will be most suited to their requirements.

Model Streets.

Models of properly improved streets were constructed in Ingersoll and in Orangeville under my supervision.

Bulletins.

Two bulletins were issued during the year, No. 1 being a brief pamphlet intended chiefly for pathmasters, while No. 2 contained a more carefully developed outline of the principles of construction.

Statute Labor.

A consideration of road and street improvement naturally divides itself under two heads :

(1) The system of expenditure and control.

(2) The principles of construction.

With regard to the first of these, it is not the intention of this report to urge any alterations from present systems, but to define a proper administration of those already employed. With township roads, under this division, a consideration of statute labor and its reorganization is an important feature. It is almost universally admitted that, as at present administered, this method of collecting a road tax is ineffectual, wasteful and unjust, and that wherever an effort to put it on a business like basis fails, the only course is to replace it with a law which will render justice to all, and will produce better roads. If the endeavor to reorganize the statute labor fails to make it effectual in producing the class of roads required, the process will at least be one of education, and will lead to the substitution of a more desirable system.

Statute Labor Abolished or Commuted

The power to abolish the statute labor system is now in the hands of the people, and has been taken advantage of in at least one instance, that of Malden township, Essex County. The township of North Monaghan, Peterborough County, submitted a by-law to abolish statute labor in January, 1896, which was carried by a vote of 2 to 1 ; plans are now being framed to establish a new system throughout the entire municipality, statute labor having last year been done away with in only a part of the township. Other townships, in whole or in part, have substituted a system of compulsory commutation. As far as I have been able to learn, these townships are Winchester, Barton, Niagara, Sarawak.

County Roads.

The County of Huron some years ago improved a considerable milage of the leading roads of the county by the issue of debentures, the maintenance of these roads reverting to the townships through which they pass. The county of Hastings constructs and maintains a system of county roads, and the county of Wellington maintains several of the main roads by county grants.

Principles of Construction.

Dealing with the actual principles of construction with regard to township requirements, I have in this report enlarged chiefly upon gravel and broken stone roads, the material for these being generally distributed throughout the province. Drainage of roads, crowning the roads, judiciously locating them, width of roadbed, width of graded portion, treatment of hills, repairs, and machinery are among the principle subjects dwelt upon. With town streets, these details of construction require a more finished treatment to accord with the different surroundings and class of traffic.

Tires.

The question of tires is a very important one, and calls for special emphasis. Were tires of a suitable width used in all cases, a very great part of the road question would be solved.

Further Topics.

In addition, the necessity of giving attention to the appearance of country roads is dealt with, touching upon the relation of fences, trees, etc., to highways. A short historical sketch of some of the early and most important roads is included, dwelling chiefly upon the methods and means used, and the various influences affecting their development.

Much other useful and interesting information might have been included in this report, but it appears advisable to limit the contents to such subjects as seem most applicable to the present condition of the roads and the means available for their improvement.

THE ROAD PROBLEM.

There must be intelligent direction before there can be satisfactory results. It is becoming apparent to the people of the Province that improved highways are greatly needed; and the people are beginning to learn that they are suffering from a sore experience; that their labor has been largely wasted, and, in addition, large appropriations from the general municipal tax funds. The energy which has been, and is now being wasted, would, if properly applied, have each year extended, improved and maintained the highways proportionately with the growth and requirements of the Province in wealth, civilization and commerce. We would, if this energy had been properly guided, be now in possession of a system of roads such as would render a "Good Roads Movement" unnecessary. In their enthusiasm to effect a change there is a great danger of the people grasping at new systems and methods regarding which they are not as yet capable of forming a correct judgment, and which they are not yet qualified to carry into effect. Councillors are influenced by the effect of the agitation on the people, and, wishing to comply with popular demands, are of their own accord hurriedly framing and adopting new plans of raising money with which to carry on the work; such is the effect, but not the intention of the agitation.

The question of road reform is a great economic problem which must be approached slowly, and solved after mature and earnest consideration, based upon sound judgment and the greatest possible measure of experience. The great need of the present crisis, as has been stated, is intelligent direction, in order to avert experiments more costly and less productive of good than those from which the public are endeavoring to escape. There is an absolute necessity of providing municipal councillors, commissioners and the public generally with the fullest possible knowledge of the subject, otherwise there will be failure, discouragement and reaction. The history of roads dates back 1,000 years before the Christian era. In Canada, little better than a century is the sum of our experience. It is apparent that so young a country should look into the matter as presented by the history of roads in other countries to see at least if there is nothing to learn. It is contended that we have an immense mileage of roads, little traffic over them, and a comparatively sparse population, and that therefore the study of roads is something to be postponed until the country is wealthy and able to undertake the construction of highways in an expensive manner. All this is rather but a more potent reason why we should, as a country, conserve our energies and exercise them in the most judicious manner.

This, to a great extent, is more applicable to cities and towns than it is to rural districts. Some of the former to-day are already struggling under a load of debt, thrust upon them by unwise expenditure, by the adoption of wrong methods and by the use of material so unsuitable for street purposes that it has not endured one-half its estimated life. If the amount of money expended by these cities in their speculative efforts were aggregated the amount of waste would be appalling, and more so when it is understood that they are now looking for new material with which to experiment afresh. Climate, local geological conditions and requirements are all very similar throughout wide areas, and yet we have each town and city carrying on its own experiments in systems of taxation and construction, relying almost entirely upon its own experience, and meeting the failures that, with a reliable source of information, could have been avoided. It may be argued that one town can readily obtain information from another on application. This is not the case. Deputation are expensive, inefficient and opposed by the people. Clerks, treasurers and all municipal officers are reluctant or unable to give the necessary labor to correspondence regarding the matter.

In rural municipalities, each with conditions and requirements similar to the others, we have toll road systems, county systems, statute labor systems, commutation of statute labor with direct taxation, direct taxation alone, plans of construction no man can number, describe or understand, embodying the peculiar notion of nearly every ratepayer who, in his turn, has at some time acted as road overseer.

The question is both very broad and very local. No one class of pavement can be clearly specified for all streets, and no one class of road can be adopted in rural districts, but these can all be divided into classes and placed before councils and the people in such a manner as to materially aid in proportioning pavements to requirements, and to the ability of the various communities. There are the country roads which are least travelled; there are those more heavily travelled leading to main highways; there are

the main highways which carry the traffic of extensive areas; there is another class of roads most largely travelled of all, necessarily rare, which verge finally into the streets of large cities; there are the streets of villages, of towns, of cities, all of varying requirements, regarding which the most reliable information should be procured. There are materials suitable for all classes of roads, and there are principles involved in the construction of pavements as with any other structure. Every building must be erected to meet certain requirements, and the nature of the structure and material used must be carefully balanced with the use to which it is put—strength, durability, service, in order to meet the requirements of economy, in all of which certain principles of construction must be observed.

There is too great a tendency to localize the question. The actual building of any section of road is a matter of an exceedingly local nature, but in obtaining the information from which to deduce both policy and specific details of construction there should be the most complete records upon which to draw. No city, town, township, county or province can afford to rely solely upon its own efforts, but each should be a source of experience for the other, and all should be able to draw upon the experience of other lands, past and present, to the fullest extent. There is a great deal of past experience on which to draw, but there is a more important present and future experience which should be indexed and made available for reference.

The data for determining the annual expenditure of money and labor on the streets and roads has never been collected with sufficient accuracy to permit a close statement of this element of our national taxation. Enough is known, however, to warrant the assertion that it is millions annually. Of this vast sum the greater part is wasted in ill-contrived and temporary repairs needed to keep the roads in a passable condition. In the present state of our taxation it is difficult to expect the people to impose a special tax to speedily improve country roads generally. It will be found that to attain the end in view the best plan is to assemble as far as possible the forces at work, concentrating the expenditure of money, and diverting to durable work as much as possible of that which is now paid for merely temporary repairs.

It is not to be inferred, nor can it be charged, that councils are less competent to deal with this than with other branches of public affairs. The difficulty is rather that the township councils have had too little to do with highway construction, and there is no person or body sufficiently responsible to the people for the condition of the roads. The most reasonable explanation of existing conditions is to be found in the little attention which has been paid to the effect and value of good roads. This in turn has permitted the administration of our laws to be neglected, and has not stimulated sufficient thought to develop an efficient organization of the ways and means available.

PART I.

COUNTRY ROADS

STATUTE LABOR.

The question of road reform has drawn attention to the statute labor system, the means by which a large percentage of the road mileage of this province has been built and maintained. Farmers' Institutes, Dairymen's Associations, Fruit Growers' and kindred associations, have everywhere discussed this phase of the road movement. It is undoubtedly the case that statute labor has done a great deal toward improving roads in Ontario since the first settlement. It is equally true that the system is entirely unsuited to the conditions found in populous and wealthy communities. It is incompatible with street improvement in cities, towns and villages, and it is urged that, in the long settled townships, the system has outlived its usefulness. It is undeniably the case that in some municipalities, the roads are to-day in a worse condition than they were ten years ago. While the pioneers knew the necessity of good roads and performed their work jealously, there is a sentiment beginning to prevail in certain sections and among the rising generations adverse to performing work on the public highways. Not only so, but those who perform work and those who have the direction of the work, are too frequently inclined to neglect and evade the true spirit of the system as it was exemplified by the early settlers. Where this neglect and evasion exists, not only do the roads interfere with the progress of the immediate locality, and therefore the country as a whole, but injustice arises in various ways between citizen and citizen, and between road division and road division. The citizen who performs his work, is taxed unequally with the ratepayer who is shiftless in its performance, while at the same time he is compelled to endure the inconvenience of a bad road. The section or road division, which does good work on the highways is unjustly treated by the neighboring division which does not do its legitimate work; the further probability is that the division which has failed to perform its work will find it necessary to obtain municipal money grants, thereby placing on the neighboring division a double tax.

A plan whereby the work of road improvement and maintenance may be carried on in a business like way is a subject that many councils are considering. It is well-known that in most municipalities there are no particular plans, other than those which suggest themselves as the work becomes necessary. Many councils are now considering better systems of road improvement and maintenance, but unless these systems are put into operation on business like principles, the result will be inferior work and increased taxation.

A Supervisor.

The direction and oversight of municipal improvements should be placed in the hands of a supervisor who should be a man specially adapted to the work, and whose tenure of office should be as secure as that of the average clerk or treasurer. The supervisor should have charge of all road and bridge improvement, and should be required to report to the council at each meeting; no work should be undertaken until it has been reported upon by him and approved by the council. He would not necessarily be actively engaged during the whole year. He should have charge of all township machinery and material required in the work connected with this department. The many economics that would result will readily suggest themselves to councillors of experience.

Pathmasters.

Road divisions or "beats" should be from three to five miles in length. A pathmaster should be a permanent officer, and his division should be such that the most of his travel will lead him over the greatest portion of it. He should not receive a salary, but should, as a slight recompense, be preferred in doing small jobs under the supervisor, where the work is not considered of sufficient importance to be let by contract. He should, in addition, give special attention to all emergency work, such as washouts, broken culverts and bridges. If the time required to oversee statute labor in his division is more than would be needed for his own statute labor, he should be paid for such excess under certificate of the supervisor or council, the object being to secure proper supervision of all work performed; the council or supervisor to determine whether the excess time was actually necessary to oversee the work of the division, in accordance with the local by-law of rules and regulations, which should be framed so as to include this matter.

Duties of Supervisor.

1st. The supervisor should prepare a plan of his district, or township, showing all roads, and the location on them of all culverts, bridges and watercourses, classifying roads according to their requirements.

2nd. He should prepare a list of all culverts and bridges, showing dimensions, material used in construction, their condition and the direction of the watercourses passing through them, with memoranda as to the course of the water and location of the outlet.

3rd. The plans and records should show, as to roads, whether they are of gravel, stone or earth, graded or ungraded, the system of drainage, and nature and extent of traffic upon them. He should carefully study the present and future requirements of traffic on all roads, the class of roads best suited to such traffic, the width and depth of metal, width of graded portion, amount of crown and other details of construction.

4th. He should possess full information as to location, extent and quality of material suitable for road construction, and amount of plank and timber obtainable from ratepayers in the township or district, suitable for repairs.

5th. He should report to the council as early as possible in each year, showing the number and location of culverts and small bridges to be re-built or repaired, with a detailed statement of all material required for this work, and an estimate of the cost. It would also be advantageous to have a probable estimate of material required during the following year, presented each fall so that, if thought advisable, it may be purchased and delivered on the ground during winter months or other most convenient season, so as to utilize as much as possible the labor of ratepayers during the slack season.

6th. His report should specify the condition of all bridges, indicating those which require repairs or reconstruction, together with an estimate of cost, and a statement dealing with such special protection work on streams as he may deem worth the council's consideration. There should also be reference to any needed re-location or deviation of existing roads with a view to doing away with bridges, culverts, expensive grades, cuts or other features which tend to prevent permanent work and economic maintenance.

7th. He should consult with all pathmasters and report to the council, showing the number of days labor in each division, the work to be undertaken, and the amount of money which should be appropriated by the council to properly utilize the statute labor.

8th. He should arrange with divisions desiring to compound statute labor for a term of years, with a view to the construction of permanent and finished work.

9th. He should take stock annually, and report to council on all machinery and implements, showing their condition and where kept.

10th. He should carefully examine all parts of the township where gravel and stone exist, and should by borings and tests, determine the quality and extent, and report thereon to the council. All material, stone, plank, gravel, etc., should be purchased by the supervisor in large quantities, and under instructions from the council, the required amount to be determined by his estimates referred to above. As far as possible the material should be purchased by tender, and due consideration should be given to any ratepayer having material for sale. When purchased it should be delivered and stored at convenient points, and placed in charge of, and used by the pathmaster, subject to the order of the supervisor, and in emergency work.

11th. He should prepare specifications of all work for which the council makes appropriations. Contracts should be awarded to the lowest bidder if proper security is given, but the work should be subject to the approval of the supervisor and all accounts should be certified by him before payment.

A municipality is merely a business corporation, the people its stockholders, the councils its board of directors and the officials the managing staff. If as much attention were paid to the management of a municipality as is devoted to a business enterprise of similar proportions, economy in many directions would follow. No business enterprise could afford to change its board of directors or manager each year, intrusting its affairs to an inexperienced executive.

COMMUTED STATUTE LABOR.

The commutation of statute labor is a system of taxation for road purposes which has been adopted in several municipalities, and is said to operate with a considerable measure of success. The assessment is based upon the statute labor list, the rate being fixed by a local by-law, The usual rate is fifty cents per day. In Barton township the rate is fixed annually according to the total expenditure for the year, and ranges from thirty-five cents to fifty cents per day. It is to be pointed out, nevertheless that, with commutation, pathmasters are still appointed, an amount proportionate to the labor on a beat being given to each pathmaster. Proper supervision of the work is as necessary under a system of money expenditure as with statute labor alone; and it is, therefore, quite as important in the one case as in the other to follow the suggestions for a proper organization of the statute labor system as to reducing the number of pathmasters and appointing a general township supervisor.

STATUTE LABOR ABOLISHED.

The township of Malden, Essex county, is the only township municipality which has yet completely abolished the statute labor system. The change was made in March, 1890. There are about sixty-five miles of road in the township. The total milage is graded and about two-thirds is metalled with gravel or crushed stone. The township Clerk, Mr. James Honor, in response to an inquiry regarding the change says :—

"We have a perfect system of doing roadwork. Whole concessions are ditched and gravelled. Water is carried until it reaches its proper outlet. No one is allowed to suffer by water being thrown in front of his farm and left there until the next road overseer is appointed to take it off. All work is done in a thorough, systematic and business-like manner. It is let by contract, superintended and received by our council. The change operates successfully and there seems to be no disposition on the part of any ratepayer to return to the old system. The cost of road improvement is paid out of the general township funds, and the amount spent on the roads annually for the past five years was about $2,000 a year.

"The cause of the change was the corrupt and expensive manner in which statute labor was done. For a number of years previous to 1890 we had commutation of statute labor at fifty cents a day, which worked fairly well for a time until the applicants seemed

to have got all the work done that they required around their farms. At the same time, our township was divided into seventeen road divisions, and seventeen prominent farmers got this statute labor given them for superintending the work that was not commuted. Each one had his peculiar views about doing road work, selfish motives, cranky notions, and occasionally no ideas at all. Some favored doing the work in the spring and some in the fall; some spread the earth on the road and piled the gravel on top of it; some put on gravel and placed dirt alongside to keep it there.

A township that has good roads, well drained and gravelled, shows a higher state of civilization and taste than one that has not. Consequently a practical man would rather locate in our township than in the neighboring ones and the price of farm land seems to have kept up as compared with other townships."

EXISTING ROADS.

The roads of most townships naturally divide themselves into three classes. The first and least important are those cross roads and little used concession roads which accommodate only a few farms; about three-eighths of the road milage will fall into this class. In the second and more important groups are those which serve a considerable neighborhood, and comprise, usually, about three-eighths of the road milage. The third group consists of the main roads which concern the community as a whole and these in some townships merge finally into the streets of large market towns and cities; to this last division will belong nearly the remaining quarter of the road milage. It is the roads of this last group which, in some instances have, in Ontario, been taken over and constructed as county roads.

It is apparent that each of these three classes have different requirements. Over the first class, the least travelled of all, half a dozen or a dozen vehicles going in one direction may be the average traffic for one day. The neighborhood roads may be called upon to accommodate twenty or thirty vehicles; over the main roads the number of vehicles daily may range from fifty to two hundred. To provide the same strength of construction in each case, would manifestly be either inadequate for the most heavily travelled roads or unnecessarily expensive in the case of the first group mentioned. Those which accommodate the greatest amount of traffic, it is apparent, will need the strongest form of construction, and on them should be concentrated as far as practicable, the money appropriations made by the municipal councils.

To the first group will necessarily belong the dirt roads. These will be gradually gravelled, but it cannot be expected, for a number of years to come, that much expenditure of labor or money can be made on them. The little wear to which they are subjected, however, rendering their maintenance very simple, will make the time required for their improvement comparatively short. These dirt roads are very much abused by the road-makers. With each annual application of statute labor, sod, vegetable mould, and stones, are brought to the centre of the road, to be mixed up into mud with the first fall rains. For six months of the year, a dirt road, (not a clay) is as good a driveway as could be desired for light travel. But in order to extend its usefulness, the greatest care must be taken to see that drains and culverts are placed wherever needed, and that they are always in good working order. It should be well crowned, or rounded up, so as to shed the water freely to the side ditches; but in making this crown, sod and vegetable mould should be carefully excluded. A great deal of injury is done to this kind of road, by running a grading machine along the edges, bringing loose stones and sod to the centre. This stuff should be thrown outward and across the open drain. Under drains should be used judiciously; while a complete system may not be used, tile drains should at least be placed where the water does not leave the side of the road early in the spring, or wherever the ground appears to be continually damp. If open drains are kept in good working order, and if the road is kept properly crowned, its condition in fall and spring will indicate the points at which tile drainage is most needed.

Nearly all roads in Ontario have at one time been mere dirt roads. By a slow process of evolution some have become gravel or broken stone roads. These gravel roads are the highways which will fall into the second and third groups indicated in a preceding section of this article. A dirt road nicely crowned and well drained will make an excellent foundation on which to place a layer of gravel. A driveway which has passed through an apprenticeship as a dirt road, and has, during that time, had due attention given to its drainage requirements, will have indicated the points at which open drains, culverts and underdrains are most needed. With these provided, gravel can be applied to the best advantage.

The object in placing a coating of gravel on a dirt road is not merely to form a hard wearing surface, nor is it to change the consistency of the mud. A coating of gravel or broken stone is placed on a road to form a covering that will not permit water to pass into the earth subsoil, and which will not permit the forming of ruts that will hold water. Unless the dirt road beneath the gravel has been provided with drainage deep enough to secure a good firm foundation, the gravel will sink beneath the wheels, ruts will form and the road will be destroyed.

Very few existing gravel roads show a proper conception of the principles of road-making. The majority are too flat on top to shed the water. The sides of the road form square shoulders which obstruct the water in passing to the surface drains. Open drains are often deep and dangerous, but are not provided with proper outlets. If drains are merely receptacles for water, the subsoil of the roadway absorbs this moisture, is softened, and in the wet weather of fall and spring, traffic forces the gravel covering downward, and the mud to the surface, mixing the gravel and soil to such an extent as to very much destroy the usefulness of the road covering.

As with dirt roads, a great mistake is made by passing a grader along the shoulders of a gravel road, to cut off the shoulders, bringing the loosened material into the centre to round up the roadway. If a portion of the shoulders happens to consist of clean gravel, this may be replaced on the hardened track of the road. But as a rule the shoulders are composed of fine stuff, sand, dirt, loose stones and sod, and is of the greatest injury to the roadway. This stuff is of such a nature as to at once roughen the road, while in wet weather it absorbs water, becomes soft and slushy, and ruins the hard gravel foundation underneath. The material composing these shoulders should be thrown outward across the open drains, and used in levelling the roadside, or it should be otherwise disposed of in such a manner that it will at least not injure the roadway. When these shoulders have been cut off, it will be advisable to pass the road scraper over the centre to take away as much fine stuff, and loose stones as possible; and on this a new layer of gravel or broken stone may be placed to complete the crown of the road.

The drainage usually found on existing roads consists of open ditches on each side of the graded portion, with a depth of about eighteen inches. They are frequently carried through rises of ground past natural watercourses. Little attention is given to the regularity of the grade in the bottom, nor to the amount of fall, as evidenced by the varying depths of stagnant water at wet seasons. The object of these drains was more to procure earth to raise the centre of the road above the water line than to lower that line. The secret of successful drainage is to dispose of water in small quantities before it gains force and headway; and for that reason it should be carried past natural watercourses as seldom as possible.

The best practice does not direct that the old open drains should be deepened for the purpose of draining the subsoil. Deep open drains are expensive, dangerous and unsightly, and the excavated earth generally does more harm than good to the road when used to round it up, especially if piled on top of gravel. When the combined cost of construction and maintenance is considered, a small tile drain laid under the bottom of each open drain is cheaper and more serviceable. It is believed by some that one tile drain placed in the centre of the grade is the better plan. In the case of an old road with a hard surface this is very difficult and expensive, and the roadbed, if metal has been used, is destroyed by so doing. If any obstruction occurs with one central drain, in

order to locate and remove the cause of the difficulty, the roadbed must be broken up, sometimes extensively. Where side drains are constructed, they not only drain the foundation, but they protect it by intercepting the soakage water from the adjacent land. Where open drains exist, as they do on the majority of roads, the cost of excavating for the two underdrains is lessened, and smaller tile may be used. Outlets can easily be had into the tile drains for surface water from the ditches, by the use of catch-basins when necessary, and this is rendered more simple when two tile drains are used.

The success of a drain largely depends upon its outlets. Frequently its usefulness is largely removed if not entirely destroyed by the imperfect outlets on private property, the result of the opposition of the landowner, and the dislike of the municipal council to invoke the aid of the Municipal Act to enforce its construction. A drain without an outlet is useless.

ROAD METAL.

Gravel.

The majority of roads in the province which have received a surface covering, are metalled with gravel. It is very plentiful, and where it is to be obtained within easy hauling distance is undoubtedly a most valuable material for use on most country roads, and on many of the little travelled residential streets of towns. In localities where gravel is not within easy hauling distance, however, it will be advisable to consider the use of other metal; since gravel, if not found in the immediate locality, and therefore expensive in transportation, will frequently be found less economical in final cost than a better, though higher priced stone. Gravel may be described as a mass composed of fragments of stone, rounded and worn by the action of air, water and ice, the pebbles representing the hardest bits of the rock from which they were detached. With it, is commonly mingled a variably quantity of boulders, sand, clay and earthy matter.

The rounded, water-worn character of the pebbles composing the gravel, does not permit as perfect a bond as is the case with a road covering of crushed stone, in which the sharp angular sides take a firm, mechanical clasp. Gravel has not very satisfactory wearing qualities, especially when it contains an excessive amount of earthy matter. Where much sand and clay is contained, it should be removed by screening, and the large stones and boulders should be broken. If there is a large proportion of the latter, a method which offers many advantages is to place a rock crusher with a rotary screen attachment in the pit, passing all the material through, thereby removing the earthy substances, and breaking the stone with the one operation. If the number of large stones is not great, it will be the cheaper plan to screen the gravel in the ordinary way or, better, by a rotary screen propelled by steam, the large stones being broken by hand or used in the road foundation.

When being prepared for use on heavily travelled and important roads, care should be taken to remove the dirt from the gravel. Sand and clay, when mixed with gravel afford an easy means of consolidating the road covering in such a way as to be very suitable for traffic in dry weather. But in wet weather, moisture is absorbed, the roadway becomes soft and slushy, ruts form readily, and the bond will be found of a very temporary nature. For little travelled roads, it may be impossible to take the precaution to screen the gravel; and perhaps if the earthy matter is not in excess, screening may be omitted to advantage; it is necessary, however, to emphasize the point that this can be recommended for little travelled roads only.

When gravel is not screened, very much may be accomplished, by care in selecting and taking it from the pit. In drawing gravel to the roads, it is frequently the case that teamsters wish to be in company with each other as much as possible. For this reason, when loading the gravel, while there may be room for only one wagon, in the pit, at the point where the best material is to be found, a dozen teams will drive in, and

the wagons are filled with whatever stuff may be most easily obtained, whether gravel, sand, boulders or clay. Another common cause of earthy matter and sod being mixed with the gravel, is to be found in the practice of tunnelling under an overlying layer of soil which gradually falls into the pit, is mixed with the metal, and is drawn with it to the road. This earth should first be stripped from the surface if it does not form too deep a strata, or care should be taken as it falls to keep it from mixing with the gravel.

In the district formed by the angle of the Ottawa and St. Lawrence Rivers, and a line extending northerly from the vicinity of Kingston, the surface is composed largely of glacial drift or "till," while in some portions of this section, bedrock appears at the surface. Gravel is not very plentiful, but that which does occur is of a hard quality, the waste of trappean rocks, contains little clay and is sometimes comparatively free from sand. It is to be looked for, usually, in narrow ridges and mounds formed in the tunnels and caves of ice, through which were the courses of sub-glacial streams. Occasionally in this district, more especially the easterly portion, lake deposits of the post-glacial age are to be found in stratified layers.

Westerly from Kingston and south of Georgian Bay, the glacial waste is overlaid to a greater extent by lacustrine deposits, of which the chief stratas are the Erie and Saugeen clays. Inter-stratified with these, and in drifts and pockets, gravel is to be found at frequent intervals. The quality, however, is not equal to that of the eastern district, being composed more largely of the waste of the local limestone strata. It is of a soft "cement" variety, and has considerable clay and sand mixed with it. Along the base of the Niagara escarpment from Owen Sound to Brantford, there is a remarkable bed known as Artemesia gravel, having an average width of about twenty three miles, and a considerable depth. This extends easterly also, following the north shore of Lake Ontario, in what is known as the Oak Ridge. While this formation of gravel is comparatively free from earthy matter, it contains a quantity of large stones and boulders which interfere with it as road metal. It is principally composed of the water-worn debris of the Niagara and Guelph limestones, mixed with which are some pebbles and boulders of trappean origin.

In searching for gravel, the clearest indications are usually to be found along the banks of streams, where any extensive strata is apt to be exposed. A post-hole auger affords a convenient means of making tests over the surface of the soil for gravel, but the best implement is generally a simple form of drill. There are cases in which gravel beds may be entered at the level of a stream bed, and water is thereby obtained for washing the metal by natural drainage, affording a cheaper means of freeing it from sand and earthy matter than by screening. Gravel is still being deposited in drifts and bars by the agency of streams; this will be found to partake of the character of the pit gravel of the locality but generally will contain less clay, although sand may easily be in excess. This is usually one of the best sources, as the gravel can be washed by natural drainage. Lake gravel is often a good metal but varies greatly. It is apt to be slatey, an undesirable quality. It will be free from dirt and clay, but contains sufficient sharp sand to secure consolidation, especially if a roller is used. Gravel which retains a perpendicular face in the pit in spring, and shows no trace of slipping when thawing out may generally be assumed to be sufficiently clean and free from clay for use on the road without any treatment other than is necessary to remove stones greater than one inch and a quarter in diameter.

Broken Stone.

It is impossible to discuss the wearing qualities of different kinds of stone for macadam roads from the standpoint of names. Granite, limestone, sandstone, are names of different rocks common in this province, but to say that granite is better than limestone, or that limestone is better than sandstone, while true, perhaps, of the best qualities of each, may be quite incorrect, since a good sandstone may be infinitely preferable to a poor limestone or granite. The best stone for a macdam road is that which is hard and tough, not easily affected by the atmosphere, moisture, and the varying conditions of

climate. The choice will generally lie between a cheaper and less durable stone near at hand, and a more costly but better stone from a distance. The city of Cleveland, Ohio, is for example importing trap rock from Poole Island near Bruce Mines, on the north shore of Lake Superior. This rock is very hard, tough, and for qualities of endurance can scarcely be surpassed on the continent.

A great portion of macadam roads in Ontario will be constructed of limestone, since this rock is the most common, quarries being within easy access of almost any part of the province. In quality it ranges from that which is useless to that which is almost equal to trap. Limestone which is tough and closegrained, is an excellent material for roads on which the weight of traffic is not excessive. Some dolomitic limestones, while hard, appear to lack in toughness. Other limestones of a slaty texture have few wearing qualities, are rapidly disintegrated on exposure to the atmosphere, and should be avoided. Some limestones of an open, porous nature, yield readily in this climate to the effects of moisture and frost, merely turning into mud. But the excellent binding qualities of limestone make up largely for a lack of hardness, a sort of cement being formed by the dust, which adds very much to its durability.

Some qualities of granite rank high, but much of it will crumble readily, and wear into sand. It is to be had in many parts of northern Ontario, and could be easily reached by boat or rail. Except when the traffic is unusually heavy on the road to be paved, and the best granite is obtained, the cost of transportation will debar it from use in the greater portion of Ontario. Gneiss, like the granite, occurs in vast quantities in the northern districts, and is of variable quality. That containing much felspar or mica is the least desirable. Sandstone is seldom of service, except when used for very light traffic on country roads, since it also readily crumbles and wears to sand. It is quarried chiefly at the Forks of the Credit.

Limestone is quarried very largely at Queenston, at Hagersville and other points along the Grand river, at Kingston, and the counties east; granite is obtainable in the more northern part of the province. Trap rock occurs in dikes of considerable proportions near Kingston and Gananoque.

In determining the best quality of stone for road purposes, there are four prominent destructive agencies which have to be considered: (1) The crushing action of loads. (2) The grinding action of the wheels. (3) The blows from the shoes of horses. (4) Climatic influences of air, water and frost.

With respect to the first three, a stone may have great hardness and splendid crushing strength, but at the same time be brittle, yielding readily to the grinding effect of wheels, and the blows administered by the hoofs of horses. On the other hand, a stone may be able to resist, in a measure, the second two wearing agencies, those of "abrasion" and "impact," and yet be so soft as to crush readily.

The fourth agency, the decomposing effect of the atmosphere, is one of very great importance. The denser stones, those which absorb the least water, are usually best able to resist the injurious action of frost and moisture. The weight of a stone is usually some indication of durability in this respect, the lighter stones being those of less density, and in consequence are the less desirable.

There are other features which a good rock for road-making should possess. When crushed they should break into a compact form. A stone that, in breaking, takes thin, flakey shapes, will not wear so long as one that breaks into cubical pieces, nor will it consolidate so readily in a roadbed, for a wheel, in passing over the side of a flat stone, will throw it out of place and loosen the stones adjoining.

The tests usually applied in determining the qualities of stone are those which indicate crushing strength; the power to resist impact and abrasion; the density, determined by the weight of the stone; the amount of water absorbed. While elaborate trials may be made, a practical man can judge of the qualities of a stone by applying simple tests; by breaking the stone with a hammer; wearing it on a grindstone; crushing it in a black-

smith's vice ; scratching with an iron nail ; breaking small pieces with the fingers. By such simple means, a general idea of the stone can readily be formed, but no test is conclusive except actual wear on the road, for varying local conditions, lead to varying results.

Boulders.

Broken stone produced from boulders is objected to as road metal on various grounds. The rounded sides will not permit consolidation with the minimum of vacumn. If they have been exposed to the atmosphere the boulders are very apt to be decomposed, are soft and will crumble readily. The mixture of different kinds of rock on the road surface, some hard some soft, permits unequal wear, and produces a rough surface.

While these are defects which certainly are not to be overlooked in the choice of road metal, boulders nevertheless, constitute a very valuable material for the construction of a road, particularly in localities where they are plentiful and gravel or bed rock not readily obtainable.

Boulders are generally the result of glacial action. A large portion of the province is overlaid with "till" ; that is, a mixture of boulders, clay and pebbles in varying proportions, brought down by the rivers of ice, and left in a broad irregularly disposed sheet, as the ice melted. In some instances, the retreat of the ice, as the glacial age passed away, was interrupted by pauses and readvances. This created the frontal moraines or ridges of debris pushed out by the glacier and deposited along its front. Subsequently the inland lakes and rivers which have been obliterated by upheavals of the earth's surface, together with lakes and rivers now existing have covered up much of the material and acted upon the glacier waste in many ways. The rain also, washing away the earthy material supporting boulders on the hill tops, has left them exposed, or permitted them to roll to the valleys below.

Frequently these frontal moraines are distinct features of the landscape, as is the case between the southern portion Hastings County and Georgian Bay, where they appear as rough stony hills. In other cases they form merely indications on the surface of the ground, the moraine having been covered with a later deposit of fine stuff. As a rule, the moraines are better sources of road metal than the till, since in the former case there is a less quantity of clay and sand intermingled ; while the boulders taken directly from the till or moraines are generally of a better quality than those at the surface of the ground, which have been exposed to the action of the atmosphere.

The majority of the boulders to be found in Ontario are of Huronian or Laurention origin ; that is, rocks of gniess, trap and granite brought down by the glacial rivers from the distant north easterly from Georgian Bay. In some parts, rocks of local origin are to be found, notably in the counties of Glengarry and Wellington, where considerable quantities of limestone are exposed.

In selecting field boulders, care should be taken to discard all rock which shows signs of having "weathered," or decomposed by the action of the atmosphere. Sandstones and granites are peculiarly subject to this disintegration, while soft limestones are very common. Rocks which should be condemned from this cause are those which crumble readily under successive blows of a hammer, or which show iron stains when broken. A little experience will quickly teach a judicious roadman to detect the stone which is unfit for road purposes.

PLACING METAL ON THE ROADS.

In order to obtain a knowledge of the manner in which gravel, broken stone or other road metal should be placed on the roadway, it is evidently necessary to consider the objects to be attained by the use of a surface covering. Experience teaches us that these are :

(1) To prevent water entering and softening the natural soil beneath.

(2) To present a hard and durable wearing surface, sufficiently smooth to make travel and the transportation of heavy loads, easy and agreeable.

According to the first of these objects, the covering must be of such a texture as to be as far as possible impenetrable to water, and of such a shape as to shed the water to the side gutters or ditches. According to the second, the road covering must partake of the character of a floor. In summer and in dry weather, a road made of the natural soil, if not sand, is a satisfactory driveway for moderate traffic. It is to make a good wet weather road, that metal is usually applied. If the work done on the road is not successful in producing this, the efforts have either been inadequate or misapplied.

The customary way of putting gravel and broken stone on the road is to merely drop the metal from the wagon, leaving it, as it falls, in a continuation of irregular heaps, to be levelled and consolidated by traffic. This metal is usually placed on the road in June. Vehicles at once turn away from it and find a more serviceable dirt drive along the side of the road or in the gutters. Traffic continues to follow the dirt roadway until such a time, late in the fall, when it has become rutted and muddy. Not until forced to do so by the impassable condition of the dirt track, do vehicles turn to the metalled portion. If this dirt track is between the metal and the ditch, the ruts and holes will interfere with surface drainage ; will prevent the water reaching the ditch quickly from the crown ; will be receptacles for a large amount of water. In soaking away, this water will pass under the gravelled portion, and assist in softening the natural sub-soil which, in a well made road, must be sufficiently dry and firm to support the weight of traffic. The gravel or stone lying loosely on the road, has permitted water to pass through it to the natural soil below, as through a seive. The first effect of wheels passing over it is to create ruts in the metal itself. These ruts in turn become receptacles to hold water, the gravel in the ruts is quickly forced aside and downward, and the wheels sink as far as the mud will permit them. Winter may freeze the ground, and afford a firm means of travel during the frosty season, but when the weather breaks up in the spring, the roadway, upheaved and honey-combed by the ice which formed in and below it, is many times worse than in the fall.

It is evident that to drop gravel, and especially broken stone, loosely on the road is very far from being an economical system of roadmaking. The summer succeeding the application, the road, after the ruts are worn down, may become a good driveway ; yet the gravel or broken stone has been so churned, and mixed with dirt, that its life and durability have been largely wasted before it becomes sufficiently compact to answer the purpose for which it was intended.

A great deal, by very simple means, can be done towards getting better results from the road covering. The metal when first placed on the road could be nicely spread with a rounded surface, as it is intended to lie when consolidated. The metal, particularly if gravel, will, during the summer, consolidate much better than if left in a high heap. In the fall it will be harder, and, not presenting so formidable an obstacle to travel as a series of irregular mounds through which the horses must wade, vehicles will turn from the temporary dirt tracks earlier in the season, before the subsoil has become very soft. If at this period a man is sent along the road, with a rake to fill up the wheel tracks as they appear in the loose gravel, or broken stone, traffic will, in a short time, very effectually consolidate the road. The expense of a man in raking the metal into the ruts and keeping the road properly rounded up during the fall and spring, will be more than saved in the future repair and re-metalling, while a much better road will be the result.

ROLLING COUNTRY ROADS.

Although much can be done by the use of a rake, to assist traffic in consolidating the metal, as indicated in the preceeding article, "Placing Metal on the Roads," the road, nevertheless, should be made for traffic, not by it. A much better plan is the use of a road roller, the advantages derived from which are several:

(1) A good track is immediately obtained, and vehicles at once take the centre of the road.

(2) A dirt track is not made near the ditch, and, by this means, the side of the road is not cut up and made so uneven as to interfere with surface drainage.

(3) Traffic is not inconvenienced in fall by having to drive through loose gravel or crushed stone.

(4) The gravel or stone is not forced down into the sub-soil by the wheels and feet of the horses; is not churned and mixed with the earth, and there is in this way a great saving in the amount of metal.

(5) There is a great saving in manual labor, and repairs are more easily and effectually made.

An impediment to the use of heavy rollers in a good many townships, is the insufficient strength of bridges, and culverts; and, while valid in some instances, the objection is liable to exaggeration in others. Weak wooden bridges and culverts could in many cases be temporarily strengthened sufficiently; while in others, they could be entirely avoided by first completing the rolling on one side, and then passing around a block or so, to commence work on the other.

It is not probable that many townships councils will find themselves in a position to purchase a roller for the exclusive use of one township. In England, the county councils usually undertake this measure. If this were done in Ontario, the roller could be rented to the townships for use on the main roads. Other townships are so situated that they could rent from towns in the vicinity which own a roller. Or, as suggested in discussing stone crushers, a private citizen could be induced to purchase the roller under proper assurance of employment. When the benefit to be derived from the use of rollers is better understood they will be more generally adopted.

DRAINAGE OF MACADAM ROADS.

A prevailing impression with respect to macadam roads it that an allowance which has had the centre portion raised and levelled, with open trenches at the side, and a layer of gravel loosely dropped on the graded portion, has been macadamized. This is very far removed indeed from the principles laid down by Macadam, the principles which have changed the roads of England from a state of impassibility to a condition of excellence, unsurpassed by any in the world.

Macadam insisted upon the theory that it is the native soil which really supports the weight of traffic; that while it is preserved in a dry state, it will carry any weight without sinking, and that it does, in fact carry the road and carriage also; that this native soil must previously be made quite dry, and a covering impenetrable to rain must be placed over it when in this dry state. To the erroneous opinion long acted upon, that, by placing large stones in the road bed and covering them with smaller metal, although the sub-soil was in a soft, wet state, a good road could be made, he attributed the bad condition of most of the roads of Great Britain. The first requisite of a macadam road is drainage.

Subject as we are, to continued autumn rains, followed by a period of severe frost and snow, with the attendant thawing and flooding of spring, it becomes of prime necessity that, in Ontario, drainage must be as perfect as possible. So little is the truth of

this recognized that a drive along not only our country, but many of our city and town roads, would lead one to think that to get the water into the road and to keep it there is the idea of our road-makers.

Underdrainage, except in very rare cases, is entirely ignored. Surface drainage generally consists in heaping up a driveway in the centre of the road allowance, coveri ·g this with a loose coating of gravel, and leaving the excavations at the side of the roadway thus formed to hold water, since, although called "drains," they seldom have outlets. The water held in these trenches soaks into and softens the foundation of the roadbed until there is a sort of floating island.

To remedy this state of affairs, gravel is, by our road-makers, continually heaped on in the hope of in same way covering the water and corking up the mud. This is a very expensive and unsatisfactory method of roadmaking. Underdrains of commons field tile (provided with outlets) to "lower the water line;" and open drains or gutters (also provided with outlets), to carry away surface water, are the practical means of creating a foundation for a road. With a soft, wet, yielding foundation, a road is no more durable than any other structure under similar conditions.

Any thoughtful farmer who knows the effect of underdraining in his fields will at once recognize its usefulness in road-making. In the fall, water will be rapidly removed from the bed of the road and the destructive action of frost lessened. In the spring, the frost will come out of the ground more quickly, and each of those periods in fall and spring are shortened, when, with the foundation and surface thoroughly saturated, the roads are not only impassable on account of the mud, but are injured by traffic more than in all the remaining nine or ten months of the year. One year's statute labor with the annual appropriation, spent in providing proper drains for the roads of the province would do more than can be done in five years with the present method of merely filling the holes which appear, with gravel or crushed stone.

Underdraining and grading should be carried on simultaneously. Unless drained, the traffic during the ensuing autumn and spring will usually leave a graded road as shapeless and rough as a pioneer wagon track can be. If drained, there will be a foundation for the gravel or crushed stone to rest on when applied.

A porous soil, like a sponge, retains in its texture, by attraction, a certain amount of water. When water in excess of this is added, it sinks to the first impenetrable strata, and from there it rises higher and higher until it finds a lateral outlet; just as water poured into a pail will rise higher and higher until it finds an outlet in the side of the pail, or until it flows over the top. Underdraining supplies the necessary outlet for this excess moisture at a proper depth from the surface; it "lowers the water line."

With plastic clays the process is slightly different. Clay will absorb nearly one-half its bulk and weight of water. In drying, it shrinks and is torn apart in different directions. The fissures thus commenced by a tile drain become new drains to lead water to the tile; and so the process of contracting and cracking continues until a net work of fissures is produced, and the stiffest clay is thereby drained.

The injury done to roads by frost is caused entirely by the presence of water. Water expands on freezing, and the more there is under a road, and above frost line, the greater is the injury. In freezing, the particles of soil in immediate contact with the water are first compacted. When room for expansion ceases within the body of the soil itself, owing to its saturated condition, the surface is upheaved. When thawing takes place the sub-soil will be found honey-combed, ready to settle and sink beneath traffic. It is therefore of the utmost importance that the soil should be relieved of all water of saturation as quickly as possible by underdrainage. The impassible condition of most roads in Ontario during the spring, often axle deep with mud, is to be attributed very largely to a wet sub-soil which has been honey-combed by frost.

The extent to which underdrainage should be used, must be controlled by the quality of the soil over which the road is laid. There are instances on sandy, gravelly and porous soils, in which underdrainage is so perfectly provided by nature that artificial

drains are not needed. Clays nearly always are benefited to such an extent as to render the outlay for sub-drainage a most profitable investment. The necessity of drainage is further controlled by the situation of the road. If the ground is high-lying it will be less in need of drainage; but if low-lying, or if it receives the soakage water from up-lying lands, it will usually be impossible to secure a dry sub-soil without the use of tile.

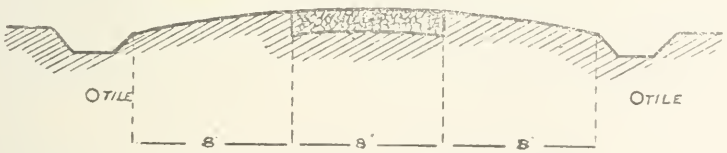
The drain should be placed below frost, otherwise water freezing in the tile will burst and destroy them. If not below frost line the drain will be apt to be stopped up during the spring, the period during which it is most needed. The fall should average one foot in 100; the minimum should never be less than one in 1,000. The tile should be evenly laid; the capacity of the entire drain is regulated by the smallest portion, and to lay tile in an undulating line is equivalent to reducing the bore; when unevenly laid it has a further tendency to catch sand and solid matter, producing stoppages.

There is some dissension among road-makers as to where underdrains should be placed with respect to the roadway. Some prefer one tile drain under the centre of the road, this with the mistaken idea that the water will be caught as it percolates through the road bed A road bed, if nicely crowned and well compacted under the roller, will shed the surface water to the side gutters without permitting it to pass, to any extent, into the road foundation. It is better practice to place two tile drains, one under each of the surface gutters or ditches where they may if necessary, serve as outlets, catch-basins being provided to permit surface water to enter the tile when natural outlets cannot easily be obtained.

The advantages of the two tile drains, one under each side of the roadway, compared with the plan of having one drain in the centre, are several: The two drains are more effective in securing perfect drainage than one could be; the aftermath of settlements in the centre of the road is avoided; the tile drains on an old road can usually be laid at a greater depth if placed under the old open drains; the expense of placing one drain in the centre of an old road is often greater than that created by placing two drains at the sides; when at the sides they may be more easily used when needed, as outlets for surface drains. The rule, however, of placing tile drains on each side of the roadway need not be rigidly followed, but should be judiciously applied, according to the amount of underdrainage needed, the nature of the soil, the location and the opportunity for obtaining outlets.

DIMENSIONS OF COUNTRY ROADS.

The width of the graded portion on the majority of country roads has already been fixed. Various ideas have prevailed among the different pathmasters regarding this detail, and the width differs accordingly, ranging from ten to forty feet. In the case of old roads which have been coated with gravel or crushed stone, it will seldom be deemed practicable to change the existing width. Twenty-four feet between ditches will generally be found ample, while less than eighteen feet is seldom advisable.



CROSS SECTION OF COUNTRY ROAD.

Common field tile underneath open ditches. Gravel or broken-stone roadbed, eight feet wide.

It is not to be understood that the width of the graded roadbed is necessarily the width of the metalled portion. The latter, for the majority of country roads, need not exceed eight feet, but for very largely travelled highways, may increase to twelve or even sixteen feet.

The depth of gravel or stone to be used must vary with the quality of the material, the amount and nature of traffic on the road, and the nature of the sub soil. It is obvious that a dry, compact and stony sub-soil will need less metal than would a plastic clay, difficult of drainage. No definite rule can therefore be laid down other than that from six to twelve inches of well consolidated material will afford a sufficient range to accommodate most circumstances. Under proper conditions, ten inches of metal should accomodate the heaviest traffic to which a gravel or broken stone roadway can be economically subjected.

From the edge of the open drain the graded portion of the roadway should be crowned with a circular rise of one inch to the foot from side to centre. That is, a driveway twenty-four feet wide should be one foot higher at the centre than at the side. This amount of crown compared with European practice may appear excessive, but with gravel roads, and roads metalled with the quality of stone commonly available, this crown is no more than sufficient to provide for the wear and settlement, consistent with good surface drainage.

The elevation of the road above the level of the adjacent land, need not be greater than is sufficient to provide against the overflow of storm water, which should always be guarded against. The depth of the open drain must vary according to the amount of fal and the quantity of water to be provided for ; also according to the sub-drainage needed and provided. When tile sub-drains are used, the open drain can usually be very shallow ; in which case the width of the graded roadway can be narrowed, there being no danger of accidents such as are caused by a deep trench at the roadside. The tile drains, as elsewhere stated, should be placed below severe frost, usually a depth of three or four feet.

CROWNING.

A very notable defect of most country roads is the flat or even concave surface ; others present the opposite extreme, and are so rounded up as to be dangerously high in the centre, making it difficult for vehicles to turn out in passing. Roads must be crowned sufficiently to shed the water from the centre to the open drains at the side, otherwise water will stand in the roadway, soak into it, soften and cause rapid wear and decay; but a crown higher than is necessary to properly drain the surface is also objectionable.

The amount of crown must be sufficient in the newly constructed road to provide for wear and settlement. It should be greater in the softer and rougher varieties of pavement than in those which are hard and smooth ; a gravel road, or a broken stone road, must have a greater crown than a brick pavement. The amount of crown needed on a gravel road or one of broken stone varies with each of these classes according to the quality of gravel or stone, the nature of the subsoil and the care taken by rolling to provide against settlement. The amount of crown for newly built gravel roads has been stated under "Dimensions of Country Roads," as one inch of rise to the foot of width from the edge of the ditch to the centre of the road, and this should be increased in the construction roads on hills according to the steepness of the grade.

The amount of crown should not be more than sufficient to provide for surface drainage. A steeper crown than is necessary tends to confine traffic to the centre of the road, and in turning out, the weight of the load is thrown on one pair of wheels in such a way as to rut the side of the road. The shape of the crown is a matter on which expert road-makers differ, but with the class of material available for roads in Ontario, and the methods and plans of construction, a form as nearly circular as possible will be found most serviceable, and most easily obtained.

HILLS.

Roads located on hills, or along the sides of hills, are generally found difficult to build and maintain, and very often we find a very large proportion of statute labor annually placed on them, to little effect. The difficulty usually arises from the rushes of storm water, from springs underneath the road, and, especially on sidehill roads, from water soaking from higher levels.

The rushes of storm water are often occasioned by the practice of carrying water long distances in open drains, and finally pouring it over the hill by the roadside. If the hill is steep, and a cut has been made, the water is not, and very often at the time of spring floods and freshets, cannot be kept in the open drains, and so is allowed to make a channel of its own down the centre of the road. This condition is the common result of not disposing of water in small quantities along natural watercourses. No water should, as a rule, be allowed to pass over the hills by the roadside, except that which naturally falls on the surface of the slope. Provision should be made for the disposal of water in the drains back of the hill, by carrying it through private property, under the authority of the Drainage Act, if necessary. Property owners, however, should understand the wisdom of permitting drains to be constructed across their lands, when the benefit to be derived is not only better roads but better drainage of their own fields.

The surface drainage on hills should be very pronounced. The crown of the road should be slightly higher than is needed on level ground, a rise of one and one-half inches to the foot from side to centre being advisable for gravel roads. The crown must be sufficient to draw the water to the side gutters, and to do so, it must be sufficient to overcome the tendency of the water to flow directly down the hill, following the line of the wheel tracks. If the water commences to take the latter course, the wheel tracks are quickly deepened to ruts, stones are loosened or protrude, and the road becomes roughened and channeled.

Under-ground currents of water often find outlets on the hillsides. If any of these springy places occur under the roadbed, it will be necessary to tap them at a good depth below the surface with tile drains. In such cases, tile drains will be needed under the open drains at the sides of the road, and the blind drains may then be carried diagonally across the road into the side underdrains. The open drains will sometimes need to be protected with cobble stones, if the hill is long or subject to damaging rushes of water.

Roads passing along the sides of hills are frequently softened and injured by the soakage water from high lying lands. This water should be intercepted before it passes under the road, by a deep drain along the side of the roadway next the hill. Tile should be used, if possible, instead of a deep open drain, and the trench filled with gravel, stone or other porous material, to more readily intercept and absorb the soakage water.

Municipalities will usually find it a measure of economy to bring hill roads to the grade at which they are desired to remain as quickly as possible, and to this end special money grants will be necessary. To leave such work to be performed by statute labor alone is not often satisfactory. The grading done one year is apt to be so inefficient that it is, in a large measure, destroyed by the rushes of water in the ensuing wet seasons. The roadway, moreover, being annually covered or cut for a number of years, is slow to settle, becomes impassable on the slighest provocation, and absorbs labor which is needed by other sections. Municipal grants are needed on main roads, but they are also needed in doing permanent work on the lesser travelled roads, where hills or other unusual circumstances of location render the construction of roads a matter of more than average difficulty. The labor and cost of road building should be equalized as far as practicable among the different sections of the municipality, so that efforts put forth in road improvement will not be retarded by discouraging difficulties.

EMBANKMENTS AND CUTTINGS.

The protection of the sides of cuttings and embankments should be skilfully attended to. It is very common to see these washed away in places after a heavy rain, or after the spring thaw; the sides of the cuttings settle into and fill the open drains, and the water is forced into the road; the sides of embankments wash away leaving dangerous holes in the road. The tendency is to make cuttings and embankments too steep, with a desire to do the least possible amount of work.

The stability of earth slopes is endangered by the action of air and moisture, especially by alternate frost and thaw, and depends on the ease with which water is drained away. A certain amount of moisture increases the strength of the slopes, but too much acts like a lubricant, and reduces the earth to a semi-fluid condition. Clay retains water and becomes pasty. Sand, if in a basin of water-holding earth, becomes a quicksand and is completely unstable. A mixture of sand and clay, the former favoring the access of water, and the latter preventing its escape, is one of the most difficult cases to deal with. There is a certain "angle of repose" at which the tendency of earth to slip is overcome. This angle varies with different kinds of earth, under various conditions of moisture. Wet clay is troublesome, and an angle of about 16 degrees is sometimes needed to secure it. Well drained clay, however, will rest at an angle of 45 degrees, or a slope of one to one. With average gravel and compact earth, a slope of one to one is a safe angle, although first-class gravel will retain an almost vertical face for a considerable time. Sand varies greatly, "water sand" being no better than wet clay. Dry sand usually needs a slope of one and one-half to one. Vegetable earth, also, is apt to be unstable and needs a slope of one and one-half to one. Rules of this description cannot be laid down with sufficient accuracy to be of use, except as they serve to indicate what is to be expected with different soils. The qualities of soils are so variable that it is necessary to learn by observation what slope is needed for a particular piece of earthwork.

The natural form of an earth slope when in permanent repose is a concave curve, with the flattest portion near the bottom. There is a careless tendency to leave the slope rather in the opposite form, with an outward curve. Convex or straight slopes will invariably slip until the natural form is obtained, and in cuttings or embankments approaching ten feet in height, care given to a proper construction in this regard is always profitable.

A dry stone wall at the foot of an embankment or cutting will protect the drain from slipping earth. A coating of sod is one of the best protectors to the slope; and a few inches of vegetable mould over the surface, with a liberal sowing of grass seed, is a measure sometimes adopted.

LOCATION OF ROADS.

A very great number of the roads in this province are faultily located. This has resulted not only in waste and inconvenience in transporting loads, but has very materially increased the difficulty and expense of building and maintaining the roads. The basis of land surveys must be rectilinear; concessions and lots should in the survey be marked off by straight lines. The difficulty has arisen from blindly following these lines in the construction of roads, irrespective of their suitability for the location of a road. While land has been subdivided by straight lines, it was never the intention that these lines should mark unalterably the route of roads.

There is an advantage to the farmer in having all his fields of rectangular shape, as they can be cultivated more easily than when outlined by circular or irregular lines. There is a disadvantage, too, in having an estate cut into separate sections by diverted highways. These are obstacles to the proper alignment of roads in long settled and populous districts, but present little difficulty in new portions of the province. How-

ever, it is usually very much more to the interest of a property owner that the roads leading to his farm should be good and easily maintained than that his farm should be in a compact block with the roads to it impassable during a portion of the year, and even then expensive to build.

It is, of course, desirable that a road between two points should be as direct and short as possible. But a road is not necessarily more direct because it follows absolutely one pointing of the compass. The line followed by a vehicle, leading up the hills and down into the valleys, may be no shorter, nor perhaps as short, as a diverging route following comparatively level ground. Not only may nothing be gained in point of directness by following the line of the original survey, but there is to be considered the greater horse power required to move loads up and down the hills, demanding, too, a greater expenditure of time.

The expense of building a highway is materially increased by steep grades. A moderate divergence of numerous highways in the province would do away with many expensive and unsatisfactory cuts and fills, and with a large number of bridges. The unsuitability of the soil also, if low lying, swampy, or composed of vegetable matter, may render advisable a change of location in favor of a course which will offer a firmer and more easily drained subsoil.

Directness must frequently be sacrificed to obtain an easy grade, and to avoid expensive construction over bad ground, cuttings, fills, bridges and excessive grades. Councils are authorized to alter the location of roads by the Municipal Act, in a manner fair to all parties, and it is advisable that this power be judiciously used whenever circumstances render it practicable. Opposition will no doubt be offered in some cases by the individual property owners affected, but councils representing the general public have a responsibility resting upon them which should not be shirked in a matter so important.

REPAIR AND MAINTENANCE.

Roads should be repaired, not once a year, nor twice, but as soon as signs of wear appear. The statute labor system as usually operated, with one annual overhauling, is the most wasteful plan that could be adopted. Ruts should not be allowed to form in a gravel or stone road when once properly constructed, but material should be kept in place by a constant use of the rake. Settlements and hollows should not be allowed to hold water and create a pitchhole for want of a load of metal. Drains should not be allowed to become obstructed, thereby saturating and softening the whole roadbed, because it is nobody's business to spend a few hours in freeing the water. Culverts should not stand full of water to be burst by the expanding ice because of a neglected outlet. An almost inexhaustible list of these everyday occurrences could be mentioned, which in themselves apparently trifling, become in the aggregate of very great importance. Road-making is made up of details none of which can be overlooked, except at a loss.

The pathmaster should have power to give immediate attention to all emergency work rendered necessary by washouts, etc., either by personal or hired labor. Under the advice of the supervisor, he should be able to send a man over the beat as often as necessary to repair the effect of ordinary wear. Better still, a man should be employed to devote his whole time to a certain mileage of roads, which would include a number of beats, to make repairs as they become necessary. Every farmer, too, should appreciate the value of good roads sufficiently to voluntarily devote time to the roads passing his property, rather than permit them to become bad or impassable because of neglect.

If a general municipal system of employing a man to take care of certain beats is not practicable, a plan followed in at least one township may be of service; in which the residents interested in certain of the main roads have subscribed an amount sufficient in all to keep a man constantly engaged on each road. As a measure of economy, it is certainly advisable to adopt some means to prevent the roads getting out of repair.

ROAD MACHINERY.

Improved and modern road-making machinery is as necessary in the construction and maintenance of highways as are self-binders in the harvest field. Roads cannot be well or economically constructed without suitable tools and implements. If a workman is known by the condition of his tools, a very damaging reflection is certainly cast upon the majority of townships. Not merely are improved machines seldom employed, but the scrapers, plows, wagons, etc., used in the performance of statute labor are rarely on hand as needed, and the utmost carelessness is observed with regard to them.

Graders.

Road-grading machines are now very commonly used by townships. Their greatest value is in the shaping of dirt roads. The crowning of the roadway can be done very rapidly by their use, and for this work alone every township requires at least one grader. Some townships using as many as four, feel that they are needed. On gravel roads there is a marked tendency for ruts to form in such a way that the metal is forced upward and out from the wheel tracks, and a road grader can very profitably be used to level the ruts by scraping this gravel back to its place. Another important quality in the maintenance of gravel roads, is the facility with which the shoulders of the roadway can be cut off. These shoulders usually consist of square corners left in the original construction of the road, augmented by dusty material washed down from the centre. They obstruct the flow of water from the gravelled portion to the open drain. When cut off by the grader, the material should be thrown outward and across the ditch and used in levelling the sides of the road.

The stuff from the shoulders and from the ditches should never be drawn to the centre of the road, a practice which has ruined a number of excellent gravel roads. It is a mixture of dust, clay, horse droppings and sod. Placed on a good gravel foundation, it may afford a temporary benefit in summer, but in wet weather it works the destruction of the entire road. The shoulders having been formed, the proper treatment, as stated in the section on "Existing Roads," is to crown the roadway with clean gravel.

Rock Crushers.

The rock crusher is one of the most important of modern additions to the list of road-making machines. By their use stone can be crushed so much more cheaply than by the old method of hand breaking, that, so far as cost is concerned, stone roads are within the reach of every municipality having suitable rock in the vicinity. In the treatment of gravel a crusher is frequently most valuable, since, if containing many large stones and boulders, it will be possible to place a crusher in the pit and pass all the gravel through. A rotary screen attached to the crusher and driven by the same power will screen the resulting metal, removing sand and clay. Whenever a crusher is employed the rotary screen should be used also to separate the road metal into grades according to size.

The most common type of rock crusher is that in which the breaking is done by the opening and shutting of strong iron jaws arranged so that they can take in large stones, and, by successive openings and shuttings, fracture the stones until the fragments are sufficiently small to drop between the lower margins of the jaws. The fragments are there caught in a chain of pockets, or elevator, and passed up to the rotary screen, which is so designed as to separate the product into grades according to size.

Rock crushers can be readily moved from place to place, and where boulders are plentiful in the fields along the road, may be set up so as to crush stone for short sections of road as required. Municipalities in which boulders are plentiful, will find the property owners willing to provide, at the crusher, all the stone that can be gathered from the fields.

Rollers.

Road rollers, the benefit of which are referred to elsewhere, are of designs to be operated by horse or steam. Horse rollers usually consist of one main roll in two sections. The standard diameter is fifty inches, with each section twenty-six inches wide, giving a total rolling width of fifty-two inches. The standard weight is about four tons, but may be increased by loading to six or eight tons. The reversible type, whereby the tongue may be revolved from one side to the other is to be preferred.

Steam rollers generally weigh from ten to twenty tons, the most popular being of ten, twelve or fifteen tons. For country roads a weight of ten tons will be sufficient, especially on gravel roads, and in view of the strain on culverts an bridges. In towns twelve tons, with the ability to load more heavily for surface consolidation, will be satisfactory. If it is proposed to rent it for township work, ten tons will generally be better, and will give excellent results. The lesser weight, while requiring more repeated operation to compact the road metal, is believed by some to do more durable work. Steam rollers, of which illustrations are given, are all very much of the same type.

Selection of Machinery.

In all kinds of machinery, the most important points to observe are simplicity of design, quality of material and workmanship, ease of operation, lightness of draft, and adaptability to the work for which it is intended.

Operator.

Graders, crushers and rollers should not be passed around from section to section for everyone and anyone to operate, but capable men should be employed for this purpose and should always accompany them. It is further necessary to see that the operator is a man who knows something of road-making and of machinery, and has good practical judgment. A machine of itself possesses very few of these qualities, and unless the operator does, dissatisfaction and failure will result.

Purchase of Machinery.

With regard to the purchase of these machines, it is desirable that every township should possess at least one grading machine, and as many more as circumstances may require. The extent to which broken stone will be needed and the location of the quarry, will suggest the best policy to pursue with respect to the crusher. When one crusher to provide stone for the main roads of a county is sufficient, it may be advisable for the county council to own it, arrangements being made with the various towns and township municipalities, either for the rental of the machine or for the purchase of the crushed metal. Circumstances may render it advisable for a private citizen to provide metal at a fixed price per cord ; thus a man owning a threshing machine, and having the steam engine idle for a portion of the year, might be readily induced to consider such a proposition, to the advantage of all parties concerned. If water power is available within reach of a quarry, it will afford a cheap means of obtaining the requisite power.

BRIDGES AND CULVERTS.

Experience has shown durable improvements to be the most economical. One of the most common leakages of municipal funds arises from the maintenance of temporary wooden bridges and culverts. The life of a wooden structure is, at the outside, not more than one-half or one-third that of an iron or stone bridge, or culvert of cement or masonry, while the cost of keeping the former in repair during that period, is very considerable. The price of the timber is constantly rising, and, in many localities, first class material is difficult to obtain at any reasonable price. The cost of iron has been very much reduced of recent years and will probably become still less.

Good judgment is required in estimating the right size of waterway for a particular location. Elaborate rules might be given for determining the probable flow of water from a given area, but these would be of little assistance to the councillor. In this respect, consideration has not only to be given to the amount of the area drained, but also to the amount, slope and general shape of the lands drained, so as to know whether the water will reach the culvert or bridge rapidly and in a large body, or gradually with little force. The waterway must be capable of accommodating not merely the ordinary flow, but the unusual floods. Water checked and permitted to back up is a frequent source of washouts, and in the case of culverts permits the water to soak into and soften the roadway. On the other hand a waterway larger than is necessary is needlessly expensive, so that careful consideration as to the size of the culvert or width of span is a matter which must be urged. Error should be on the side of an excessive, rather than insufficient capacity.

When the country was covered with forest, the water was impeded in its flow over the surface of the ground by fallen timber, and rough and broken land; and after reaching the stream, violent rushes were prevented by standing timber, accumulations of floating logs, and other debris. These obstructions were taken away with the removal of the forests and the cultivation of the soil. Drains have been made, and furrows created by the plow, to lead the water quickly to the streams. More recently we find the ravines being stripped of their timber, thus giving an uninterrupted course to the waters swollen by the storms of autumn, and the melted snow and ice, and heavy showers of spring. In the construction of bridges and culverts these considerations must not be overlooked, and for this reason those in charge of township roads should make a systematic study of the volume and behavior of streams passing through every opening When building or rebuilding any of these structures, ample provision should be made for the free passage of water.

The present practice is generally in opposition to this principle, the tendency being to construct a narrow channel in order to lessen the span of the bridge or culvert. A disposition to use iron, stone or concrete on account of its permanency is exhibited, but with this there is a tendency to construct the channel so as to bring the cost within the limits of a certain amount appropriated for the purpose. From this cause numerous costly structures have been and are being gradually washed away at the times of great water fall.

Permanency in these structures does not consist in the use of durable material only, but also in so designing them as to provide sufficient capacity and power of resistance to any strains likely to arise.

These requirements cannot be measured by the ordinary or the average flows but by the heaviest rushes of water. Economy in this matter does not mean the saving of a few dollars in first cost at the risk of efficiency, but in the expenditure of a sufficient amount to provide for every emergency, thus securing the investment.

Bridges.

It is the custom, in erecting iron bridges, to advertise for tenders, and too frequently a committee or council completes the purchase without any advice on the matter, the lowest tender being accepted, irrespective of the quality of material, workmanship or design of the bridge. There is as much variation in the quality of iron bridges as in the quality of timber bridges.

No one pretends to be a capable judge of timber without considerable practical experience, and with iron there is an equal or greater occasion for being able to detect any weakness. Wrought iron should meet the standard of the cold bend test, by which it may be bent, without fracture, until the ends are no farther apart than the thickness of the iron; small bars should not have a less ultimate strength than 55,000 pounds per square inch, nor an elastic limit less than 24,000 pounds.

The sustaining strength of a bridge is dependent upon the weakest portion, just as the strength of a chain is dependent upon the weakest link; and for this reason the matter

of making joints is of very great importance. The tendency is to permit all joints to be riveted, a cheaper method than making "pin" and "screw" joints, but not so strong and durable.

The design of an ordinary highway bridge is chiefly a matter of economy in material, so long as one of the standard forms of beam truss, suspension truss, or bow string is used. No design should be adopted in which the amount and character of every strain cannot be fully determined. But in all these matters respecting the merit of iron, joints, design, it cannot be expected that the average councillor will be able to form, with certainty, a correct conclusion. It is unreasonable to expect it, and the council which undertakes to purchase an iron bridge of any considerable dimensions without the assistance of an expert in iron bridge construction is unreasonable in so doing. To erect a structure which is not positively known to guarantee every probability of safety at the time when the greatest strain is upon it, risking property and endangering life, is little short of crime.

In choosing an iron bridge, it is as well to permit the bridge companies to prepare their own plans and specifications; but these with the stress sheets, should be submitted to an expert builder of iron bridges, and the council should then be guided by his decision. If his services cannot be employed throughout the construction, he should at least be called upon after the erection of the bridge to see that the work has been completed according to the specifications. There are, doubtless, honest bridge companies, but, in competition, when the lowest tender is likely to be accepted, experience has proven the tendency to lower the cost by using low grade material and workmanship.

Stone bridges are the most handsome and durable that can be built. The life of such structures is limited only by the quality of the material and workmanship. Bridges of stone arches built in the time of the Roman Empire are still in existence. Owing to the greater cost, however, they are very rarely met with in Ontario, except in localities where stone is plentiful. With stone that resists decay, with the best quality of cement, with well designed and carefully formed arches and piers, bridges of masonry leave little to be desired in regard to durability. Such arches are monumental, will resist with little repair the wear of centuries, and certainly no form of bridge architecture will accord better with the landscape.

Culverts.

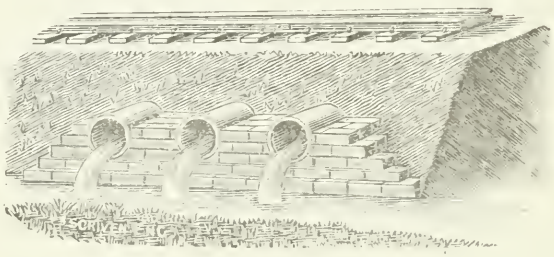
As with bridges, a large portion of the funds of a municipality is wasted on poorly constructed wooden culverts. Wood is only of temporary duration and usually renders poor service while it lasts. For the smaller sizes, cement, earthenware (sewer), iron and box stone culverts should be used. For larger culverts, arches of stone or brick are to be preferred.

Pipe can be safely used up to a diameter of twelve inches. The capacity of the culvert may be increased by laying two parallel lines of pipe. In laying the pipe, the bottom of the trench should be rounded out so that the lower half of the pipe will fit securely, with proper depressions for the "collars" or sockets, and the earth should then be rammed around the pipe solidly, but carefully so as not to fracture it. Pipes are not affected by the expansion of the earth around them, but care must be taken to provide a good fall for water, with provision for taking the water freely from the lower end. Water standing and freezing in the pipe is liable to burst it.

A culvert should be able to discharge water under head without damage to itself, and for this reason it is generally advisable to caulk or close the joints to prevent water from forcing a passage through the joints and along the outside of the pipe. For a similar reason, and to protect the pipe from injury by accidental blows, it is advisable to place a bulk head of brick or stone at each end. The foundation of this parapet wall should be placed below the action of frost. In constructing the bulk-head at the outlet, it should be set so as to provide a rapid fall to avoid the danger of settlement.

For culverts requiring a greater capacity than that offered by three lines of twelve inch pipe, stone masonry should be used throughout. Where large flake stone is plentiful, a very cheap culvert for all small sizes can be built by laying two side walls and covering with flagstone.

For culverts of from five to fifteen feet span, brick or stone masonry should always be employed. The form of the arch is a matter of very great importance. Semicircles, or full centre arches are simple and strong, but in large spans a correspondingly great rise is necessary, which may require an objectionable height. To avoid this, compound curves



may be used, but should always be designed by an engineer for each particular case, and skillfully erected, as certain mathematical principles have to be observed. The number of centres must be uneven, the tangent at the crown must be horizontal and the tangents of the curves at the springing must be vertical.

Cement concrete is being used to some extent in the construction of culverts, and with first-class cement, workmanship and design, will produce excellent results. It is important to place the foundation layers of concrete on a firm and unyielding strata of earth, well below frost and safe from the action of running water. All walls should have a batter on the side next the embankment as a protection against the thrust of freezing earth. Crib work should be firmly braced so that the cement may be thoroughly rammed. Coarse gravel, from which clay and earthy matter has been removed, may be used in forming the concrete, but clean broken stone is much better. The sand should be clean and sharp. The cement should be of some favorably known brand, delivered in barrels or other equally safe receptacles, and should be stored in a tight building, or otherwise properly protected from the atmosphere. Cement which, when opened, indicates by a granular appearance that it has been acted upon and set by the admission of moisture should be rejected.

On roads over which one hundred vehicles pass daily, one may, in almost any township, see the drivers compelled to check their horses to a respectful walk, and then bump over the corners of a box drain or culvert standing above the road. The time and energy wasted, the injury to vehicles and annoyance caused in this way would build, a score of times, good and durable culverts which would not interfere with travel. The wastefulness is plain, the remedy simple, and as such, illustrates the little thought which has been given to the care of highways.

WAGON TIRES.

Vehicles designed for carrying loads of a ton or more should have tires at least four or, better, five inches wide. With expensively built stone roads the effect of narrow tires may be so repaired as to keep the road in a fairly good condition though at very great cost. But broad tires are particularly necessary on roads such as are constructed in this country. Narrow wagon tires are the greatest destroyers of gravel and broken stone

roads built and maintained as they are in Ontario. Even with traffic which is not excessive, our country roads will not be kept in a moderately good condition so long as they are subjected to the strain placed upon them by narrow tired wagons.

There are two aspects of the question of tire widths to be considered.

(1) The relation of the tire to the amount of horsepower needed to move the load.

(2) The effect of different widths of tires on the roads.

With respect to the first of these, the tractive force required, the effect of the width of tires varies with the condition of the road. On a smooth, hard, unyielding pavement there is practically no difference. With soft roads, deep with semi-liquid mud, the advantage is slightly in favor of the narrow tire, since the wide feloe has a tendency to carry the mud with it. It is with the intermediate stage, such as exists on a good gravel or dirt country road, that the benefit arises. Through such surfaces the narrow tires cut and the load is, in effect, being constantly drawn up hill, but the broad tires roll smoothly along the top. A wagon having tires wide enough to keep the wheels from cutting into the road will plainly draw more easily than one which plows through the mud instead of running over it. Experiments have shown that the loads which on narrow tires sink to the axles can be drawn without difficulty when broad tires are used. The broader base takes the firmer hold of the road, and the wheel revolves more easily and perfectly. It is admittedly the case that wide tires are an advantage on farms, but there appears to be a persistent effort put forth to prevent their use on the roads.

It is urged against wide tires that they do not roll freely in the ruts made by narrow tires. So long as narrow tires are commonly used this will be the case to some extent; but on the other hand, if wide tires were generally used the ruts would not exist. In any case, with narrow tires the bottom of the ruts made by the narrow tires are uneven, and the narrow rims are constantly grinding against the sides of the ruts, creating the greatest friction, so that the objectionable difference is not so great as appears on first sight, if it exists at all.

It is further contended that the wide tires come in contact with more loose stones than do those with a narrow tread. The greater resistance offered in this way is more than counter-balanced, however, by the loose stones dropping into the narrow ruts. In the one case the wheel goes to the stone, in the other the stone gets in front of the wheel. The irregular bottom of the ruts, and the stones in the narrow ruts keep up a constant vibration of the wagon, which transmits a swinging motion to the tongue, galling and annoying the horses and destructive to conveyances.

Broad tires actually improve a road by rolling it down hard, and leaving it smooth so that water runs off without doing injury. Narrow tires cut and grind, burst and plow their way into the road, leaving ruts and holes to catch and hold water. The difference between the two is on a par with the difference between a pick and a pounder. The one tears up, the other consolidates.

The narrow tire is a rut producer. With a load of say 2,000 pounds, each wheel must support 500 pounds. Then a narrow, straight line, the width of the tire, must support 500 pounds. With macadam, gravel and dirt roads the narrow tires commonly used must have a greater bearing, and so, the width of the tire being fixed, the wheel sinks into the road so as to extend the bearing along its circumferance. In this manner the rut is commenced. Other narrow wheels follow, deepening the rut and loosening the earth around it. After a rain water lies in the hollow to assist the work of destruction.

Broad tires on the contrary are a benefit rather than a detriment to the road. They do very largely the work of a roller. Instead of a bearing of one and a-half or two inches, the width of a narrow tire, this is increased to four, five or more inches. The advantage is at once apparent. The broad tires do not sink at all so deeply into the road as do the narrow, but distribute their weight across the road as well as lengthways. Their broad bases do not slip from protuberances so readily, and the consequent jolting is avoided.

They do not push loose stones before them, tearing up the road, as do narrow tires, but pass over them, pressing them into the road. Grinding, upheaving and fracturing do not take place as with narrow tires, the road is compacted and compressed, and rendered thereby less pervious to moisture. This means that at all times the road is better, while the cost of maintenance is very greatly reduced. Were the benefit of broad tires better understood in Ontario, our unimproved roads would be very much less cut up, and improved roads would be more cheaply kept in repair.

In descending hills with heavy loads, it is a frequent practice with teamsters to lock one or more wheels. It is evident that the injury resulting to the road, which is very great in any case, is much increased when the load is supported by cutting tires. Hills, even under ordinary traffic, are expensive to maintain, and the width of the tire used with locked wheels becomes a very important consideration. In nearly every part of the province, this is the case to some extent. But there are districts where hills, many of them steep, are of constant occurrence. In such localities the practice of locking wheels is very common, and the necessity for wide tires is of the utmost consequence.

While a width of four or five inches is very satisfactory on farm wagons, the drays and tonnage wagons used for the transportation of excessively heavy freight in towns could reasonably be twice this. England, and all the progressive European countries, have laws regulating the width of tires according to the load vehicles are designed to draw. Sometimes the width is regulated by the size of the axle. In France, a country which presents some of our most perfect models in road-making, tires on market wagons range from three to ten inches, the majority being from four to six. The gauge of the wheels is sometimes set so that the track of the front wheels comes inside the track of the rear wheels. In New York State the turnpike law grants reduced rates of toll to vehicles with broad tires. The Michigan road law provides that users of wide tires are entitled to a rebate of half their road tax.

That wide tires are not more generally used in this country is to some extent the result of prejudice. People are not accustomed to seeing them, and wide tires, therefore, appear strange and awkward. When wide tires are generally used, as they certainly will be, the reverse will be the case, and narrow tires will be looked upon as the oddity, and a very objectionable one. As a means towards overcoming this practice, town and city municipalities could well afford to provide their watering carts, garbage wagons and other vehicles used in corporation work with wide tires.

City and rural municipalities cannot too soon set laws in motion in this regard. Obviously the use of wide tires cannot be made immediately compulsory, without working injustice. Provision could be made, however, that a by-law regulating the matter would come into force after a term of years; fair warning would thereby be given, and little inconvenience would be felt. Before the time for enforcing the by-law had arrived, the use of wide tires would, in anticipation, have gradually become more common. The beneficial effect of wider tires would then be apparent to all, and public opinion would demand and sustain the enactment. The people are competent to judge in this matter, as in others affecting personal and public interests. The great reason that wide tires are not now used is that the public has not had an opportunity to judge of their merits in a practical manner. Further, the users of the road have in the past looked at the matter of draught only. They prefer wide tires on the farms because the fields and lanes are not cut up by them. The roads, however, have been regarded as public property, and the users have not felt a personal interest in their condition.

INSTRUCTION FOR PATHMASTERS.

The council and road supervisor should use every means to interest pathmasters in the subject of road improvement, and to keep them interested. An association of township, or even county pathmasters, should be formed to meet annually for discussion and for the interchange of ideas, and it should be one of the duties of every pathmaster to attend this convention. The council should see that the pathmasters are provided with

printed matter, containing good practical hints on the principles of road-making, and the best means of carrying them into effect. A number of the directions most important to follow may, as a simple measure, accompany each year's road list. The following is a model set of rules, which could be impressed on the pathmaster by this means :

(1) Carefully plan and lay out the work before calling out the men.

(2) When preparing plans, keep the work of succeeding years in view.

(3) Call out for each day only such a number of men and teams as can be properly directed.

(4) In laying out the work, estimate on a full day's work from every man, and see that it is performed.

(5) See that all the gravel hauled is clean.

(6) Every wagon box should hold a quarter of a cord of gravel.

(7) Specify the number of loads to constitute a day's work.

(8) Properly grade and crown the road before putting on gravel.

(9) A fair crown for gravel roads is one inch of rise to each foot of width from the side to the centre.

(10) Give the roadway on hills a higher crown than on level ground, otherwise water will follow the wheel tracks. One and one-half inches to the foot from side to centre will be sufficient.

(11) Spread the gravel evenly over the road, and keep it raked or scraped into the wheel and horse tracks until consolidated. A road roller should be used for compacting the gravel.

(12) On all gravel roads, crown the roadway by cutting off the sides, putting new material in the centre. Do not cover the old gravel foundation with earth from the side.

(13) Make the width of the road as uniform and the grade as easy as possible.

(14) Remember that good drainage is absolutely necessary.

(15) Whenever water stands on the roadway, or by the side of the road, or whenever the ground is seen to remain moist, better drainage is needed.

(16) See that drains are free from obstruction, that they have a good fall and proper outlets.

(17) Surface water should be disposed of in small quantities. Great accumulations are hard to handle and are destructive. Obtain outlets into natural water courses as often as possible.

(18) Instead of having deep ditches to underdrain the road, use tile.

(19) Give culverts a good fall and free outlet, so that water will not freeze in them.

(20) Make early arrangements for having on the ground when required, and in good repair, all machinery and implements to be used in the performance of statute labor.

SNOW OBSTRUCTIONS.

To prevent the roads becoming obstructed by snowdrifts during the winter months has become an important question in nearly every portion of the province.

Snowdrifts are caused by the obstruction of the currents of air, those close to the ground, which are carrying the drifting snow. Where the forest covers the ground, the winds have not sufficient strength to carry the snow, so that it lies evenly, and with a uniform depth. Wherever the land has been cleared, currents prevail, and the velocity of these currents depends upon the extent of the clearing. The completeness with which the country is being stripped of trees is largely responsible for the blocked condition of our roads in winter.

Fences along roadways should be either entirely open or very close. The intermediate stage, found in the rail fence, offers an obstruction to the wind but permits the drifting snow to pass through, subside, and pile up on the sheltered side of the fence. This is one of the most common causes of blockades. High, close, board fences have been built by railway companies at certain points to prevent drifting, and have proven very effective, but the cost is prohibitive for ordinary highways. The drifting snow is close to the ground, and such fences obstruct the velocity and change the current of the wind, causing the snow to fall beside the fence, before passing over or through it into the roadway.

Open wire fences along the roads have been encouraged by many municipalities, the council generally providing the wire. Wire fences prevent the snow from accumulating so as to form banks and pitch holes, and is a decided improvement, but by no means a complete preventative. The uninterrupted current of the wind constantly moves the loose snow into and fills up the beaten sleigh path, making traffic heavy and gradually raising the centre of the road to such a height as to render turning out into the loose snow dangerous, especially with loaded teams.

A necessary adjunct to open wire fences along the highways is tree planting to break the current of wind, and to prevent the sweep across wide clearings in which it gathers a large amount of snow. By this I do not mean planting trees along the roadway only, but along the division fences on the farms to interrupt the velocity of the wind before it reaches the roadway. Observation will prove, wherever this plan has been adopted, or where orchards, groves or hedges exist near the road on the side from which the wind prevails, that banking occurs to a much less extent.

Tree planting is not required for this special purpose only, but it is of great importance otherwise to the country. The rapidity with which the older townships are being stripped of the forest is alarming, and no time should be lost in restoring that protection from exposure which is proving so injurious. The severe gales of winter, uninterrupted in their course, are trying to man and beast. They are destructive to fences, orchards and buildings. Trees interrupt the air currents and moderate the severity of winter gales, protecting inhabitants, stock and property. They arrest the moisture gathered up by free currents of wind in summer. They tend to modify the extreme rays of the sun which frequently, during long, dry seasons in June and July, cause so much injury to vegetation. They relieve the parched and dusty appearance of the country in summer, and break the dreary monotony of the winter landscape.

CONVICT LABOR.

The employment of prison labor in the work of highway construction is a matter frequently suggested in connection with the road reform movement. Convicts have been employed in this way in a number of the American States, notably North Carolina, where the system is said to operate with a considerable measure of success. In New Jersey, Florida, Delaware and California, prisoners are employed to some extent.

Were provision made for such a measure in this province there is little doubt that much might be gained in the advancement of road improvement. There are two classes of convicts—the short term prisoners confined in the county jails, and those confined in the provincial penitentiary at Kingston. If the latter of these, the Kingston convicts, were employed in quarrying and crushing stone, the cost would amount to about 35 cents per cord for use of machinery, explosives, fuel, etc., but not including the maintenance of the prisoners. The railways, which would be greatly benefited by roads such as will permit a more regular traffic, will doubtless be willing in Ontario, as in the United States, to transport the road metal at actual cost. The price of crushed stone could in this way be reduced very materially for many sections of the province, where road improvement is handicapped largely by the difficulty of obtaining suitable road metal. With railway transportation at a cost of $1.00 or $1.50 per cord, this, with the cost of quarry-

ing and crushing and handling, would bring the cost of the product at any railroad station, siding, or perhaps road crossing, to $2.00 or $2.50 per cord. This does not include any provision for the purchase of the quarry or the maintenance of the convicts, which are items generally borne by the state.

The prisoners confined in the county jails might, in some cases, be employed in the preparation of gravel or broken stone. Or, as in North Carolina, they could be given the work of grading, draining and spreading the road metal. With the latter course, there is an expense incurred in guarding the prisoners. Some counties have too few prisoners to warrant this expenditure, but in some cases arrangements might be made to collect the prisoners of several adjoining counties for the work. A county jail, fortunately, is usually in the most important town of the county, and the roads radiating from it are those which must support heavy traffic and, consequently, are those most in need of such work as prison labor could perform.

Prison labor in highway construction is advocated on the ground that it would thereby be withdrawn from competition with regular employments and legitimate factory labor. It is a healthful out-of-door work, and, with the majority of convicts, would be of decided physical and moral benefit. With tramps and vagrants, the measure is one which exerts a very deterrent effect.

The state's relation to prisoners is one in which revenge has no part. The object of legal penalty is the prevention of crime, and the object of punishment should be the reformation of the prisoner. The employment of convicts, in prison garb on the highway, is opposed by some on humanitarian grounds, with the belief that the effect on the public and prisoners alike would be injurious to morals. This, however, is a consideration on which the opinion of penalogists will be of value. From the standpoint of one interested in highway improvement, there can be little doubt that with the Kingston labor and the labor available from the jails of large cities, much might be accomplished.

THE ARTISTIC TREATMENT OF COUNTRY ROADS.

The artistic treatment of roads is a matter in which we have been entirely deficient; more than this, the beautiful has been neglected and sacrificed even when it might have been retained without additional labor and with no loss of the useful. Whatever beauty the country highways of Ontario possess has been bestowed upon them by nature in such a manner, seemingly, as to defy the ever militant hand of the despoiler. For an explanation it is only necessary to remember that the construction of roads in the province has scarcely yet passed out of the hands of those who hewed the first wagon tracks through the wilderness, and who are constantly engaged in a stern struggle for the bare necessities of life. It is no cause for surprise that, choosing between the useful and the beautiful, the former has invariably gained the ascendency. There is a very prevalent but mistaken idea that anything which savors in the least degree of the ornamental in road-making belongs only to the city boulevard.

To what extent the treatment of a roadside should be conventional must depend on circumstances. The most of us can recall with pleasure some roadway leading through a thinly settled, swampy lowland, and closely bordered with woods. There are very few who would wish to so vandalize the works of nature as to go with a scythe among the golden rod and asters, the flags and the grasses that fill the angles of the moss-grown rail fence. Nor would we hew away the ivy-grown stumps, nor replace the picturesque snake fence with one that is "neater." Passing, however, from the region of log houses, with their forest-encircling clearings, to the location where handsome stone and brick country villas predominate, where the woods have been almost obliterated and the fields have been brought to a condition of perfect cultivation, we must give the Queen's highway a corresponding degree of attention to bring it into harmony with its surroundings.

A century ago the first highways of any importance were laid out in the province. The forest was then the enemy alike to agriculture and roads, and the pioneer settler quickly learned, too, that it was the foe to his own means of sustenance. To-day we may, in many localities, pass farm after farm without seeing any of the original trees remaining or any new ones planted for ornamental purposes.

Trees are a necessary adjunct to a beautiful highway. To make this unqualified statement causes a civil engineer to feel some tremors of conscience, accustomed as he is in this utilitarian age to study only the economic side of construction. Trees are, as a rule, anything but a benefit to a roadway. Masses of foliage and shade, so grateful to the traveller, keep the driveway constantly damp—the bane of good roads. If, however, beauty is desired at the expense of utility, highways can scarcely be too much shaded by over-arching boughs. The happy medium will suffice in the majority of cases, and the evil effect of an avenue of trees will be more than made up by the additional pleasure obtained. Trees, however, need not be planted very close to the carriageway, but may be within the private property, or, if on the road allowance, as close to the fence as practicable. The branches should be trimmed so as not to materially interfere with the paved carriageway.

The varieties of trees suitable for the ornamentation of highways in this climate are almost infinite. Maples are most commonly used in Canada, and so universal have they become that many trees having equal or greater claims for beauty are overlooked. The elm, with its graceful, arching branches, and delicate lace-like foliage, is unsurpassed. The oak, renowned in England, is rarely used here. And so we might enumerate walnut, butternut, hickory, beech, chestnut, poplar, pine, ranging from the most delicate to the most sombre and rugged, each more or less adapted to particular requirements and circumstances. Trees such as the willow, the roots of which spread extensively or seek water, should not be permitted to grow near tile drains, as the small fibres, entering the tile, are a frequent source of obstruction.

The matter of fences is a very puzzling one. We have not yet found a shrub that will enable us to copy the hedge rows of England; and to stretch a few strands of wire is easier than to construct a stone wall. Masonry is very common in England and in the New England States. Only occasionally may it be seen here; and when overgrown with Virginia creeper or other vines the effect is all that can be desired. The wire fence appears to suit the present stage of road improvement; and in sections of the province where snow is apt to drift during a part of the year there is sometimes no alternative. Where wire is used, however, a very trim appearance may be maintained; and if the fences are made so as to be as inconspicuous as possible, and a generous use is made of trees and shrubs, the result will not be at all disastrous.

Our system of surveys, which lays off concessions in parallel blocks, with the roadway a rigid line of demarcation, and places cross roads at regular intervals, is responsible for the many cuts and embankments which mar the appearance of the highways. Could roads be laid out as are railways, in a manner that would permit the most convenient route to be taken, much more frequently would we follow pleasant, winding lines and graceful curves. Not only would roads laid out in this manner be more cheaply made, and more artistic in every way, but they would in many instances be shorter. The curve which we make in going down into a hollow and up again, or up a hill and down, is sometimes greater than the horizontal curve that would enable us to avoid the hill altogether.

Very common is the belief that in order to have a beautiful highway an expensive form of paving material must be used. The ideal roadway is of crushed stone or gravel, such as is found in the parks of large cities. A popular feeling is that asphalt has a better appearance than these materials, but this is largely due to the fact that the possibilities of gravel and crushed stone are seldom understood. Horsemen and wheelmen are unanimously in favor of macadam roads, and but very little study of the question is

needed to convince one that only when traffic becomes so great as to render the maintenance of gravel or crushed stone roadways impossible, or excessively expensive, asphalt need be used. So that its domain is the busiest thoroughfares of cities.

It is imperative, however, that the driveway shall be as perfect as possible. We are forced to form our ideas of the beautiful largely from the associations with which we clothe an object. It is difficult to harmonize with our conception of beauty a swampy roadway, into which the wheels of our carriage may have on some dismal autumn day, settled immovably, or over which, if walking, we were compelled to carefully pick our way, in danger with each step of sinking to our shoetops in mud. Poets, it is true, find their inspirations in such country lanes; and a driveway which is largely a pool of water doubtless gathers and reflects the shadows which the painter uses so effectively in his pictures. Roads, however, are not for the exclusive benefit of poets and artists; so that the work of increasing their utility will continue.

The roadside, further, must be shaped and, above all, covered with rich sod. No simple or definite rules can be laid down for this portion of the treatment of highways, and the best law-giver in this respect is nature. Nature does nothing stiffly, with rigid and abrupt lines, but has an infinity of gradations and shadings. An attempt to obtain a perfect level will be futile, and we would only secure awkward grades and stiff transitions. Long, easy, swelling lines should be sought.

The science of roads is principally a matter of drainage. Not that the shaping of the roadway, the gravel covering, and other details are unimportant, but that these are a part of the system of drainage. The deep, dangerous and unsightly open ditches that are so frequently to be seen on either side of the roadway, however, are a great impediment to beauty, and must, in the artistic treatment of our highway, be replaced by underdrains of common field tile, which expedient affords an inexpensive remedy. Shallow gutters must of course be provided to carry away the surface water, but they need not disfigure the highway.

A great mistake is made in grading into a carriageway too wide a portion of the road allowance. For the great majority of the country highways in the province, twenty-four feet between gutters is ample, the central eight feet only being macadamized. We admire of course, broad and smoothly rounded driveways, but wide stretches of sod are equally handsome. The driveway must not be confounded with the road allowance, the statutory width of which is sixty-six feet; and this for artistic effects, as well as on sanitary grounds, should never be less, preferably greater.

In no particular are there better opportunities for the artistic treatment of highways than in the class of bridges and culverts employed. The introduction of steel for this purpose permits us to do away with the clumsy and awkward wooden structures which so seldom in their youth are pleasing, and which in old age become grotesque rather than picturesque, replacing them with bridges that are graceful and slender, but strong. Substantial arches of stone are, beyond question, the handsomest that can be employed, their great strength and durability appealing forcefully to one's aesthetic feelings.

To render our highways beautiful at a stroke is an herculean task not to be attempted. To impress upon a certain section of the community the value of beautiful highways is the first step in the much needed reform. Having thus gained the point at which this class of improvements will be systematically brought about, the beauty of the highways will in their turn teach the people their desirability. Men are instinctively better citizens for being surrounded with that which is pure and beautiful. The artistic treatment of highways would be a constant reproach to the shiftless; neglected lawns would become fewer; ramshackle houses and barns would be less common; the eye refreshed and educated at every point, a journey along our country roads would mean to us a journey into a vast park.

DEVELOPMENT OF ROADS IN ONTARIO.

The story of a nation's highways is the story of a nation's progress in civilization, wealth and commerce. A country which has no roads is the home of the savage; a country, the roads of which are typical of the highest stage of engineering science, has attained an equal standard in other branches of refinement. A review of the development of roads in Ontario, as with the roads of other civilized lands, takes us back to the period when the province was a portion of "darkest" America, covered with a primeval wilderness, peopled by that unfortunate race of which but a fast decaying remnant remains.

An Indian trail was merely a path winding through the wilderness. Obstacles were avoided in preference to removing them, and so we find the trails encircling swampy lowlands, or places subjected to inundation, or such ground as would be likely to retain a footprint—a matter of serious moment to the secretive nature of the American savage. The trails passed through dense thickets of underbrush and over fallen logs. Streams were forded, for there were no bridges. They very commonly followed the line of the lake shores and the valleys of rivers. The more important were portages between the head waters of streams. Along these the Indian carried his birch canoe, by means of which he ascended and descended rivers in making his journeys. The most frequently travelled trails became worn by the habitually stealthy step of moccasined feet until more or less distinct, but others were scarcely to be distinguished even by the observant eye of an Indian, to whom a turned leaf, a broken twig or a displaced stone was ample guide post.

The most important of these routes, frequently referred to by early writers, led from Burlington bay to the head waters of the Thames, down which the traveller might descend by canoe to Lake St. Clair. A branch of this trail, mentioned by Galineé, led from the ford at the Grand river to Long Point. An early map shows an Indian path following the north shore of Lake Erie. Trails led from Lake Erie to Chatham and London. From the northern branch of the Thames, a short portage and canoe route led to Lake Huron. A trail led from the Don to Burlington bay. Nottawasaga Bay was reached from Lake Ontario by the Trent valley; by the Don or Humber and portages to Lake Simcoe, from which several routes might be taken. One of these last led from Kempenfeldt bay to the Nottawasaga river; another passed by way of the River Severn.

The first explorers, traders and settlers who entered this portion of Canada, in the absence of roads, had to adopt the methods and means of travel used by the aborigines. Champlain, who in 1615 made the first tour of discovery, went by canoe up the Rivers Ottawa and Madawaska, across Lake Nipissing, and thence by the French river to Georgian bay, a journey which necessitated about forty portages. This was the route generally chosen by fur traders for many years. Champlain, from Georgian bay, reached Lake Ontario by the Trent valley trail. The pioneer settlements were located around the forts at Detroit and Niagara. The United Empire Loyalists, who were among the first to enter the province, about 1785 began to make clearings along the River St. Lawrence, the Bay of Quinte and in the vicinity of Niagara and Detroit. Those who went inland usually chose property so situated that they might reside near a stream, down which in summer they could journey by canoe, and which, when frozen in winter, afforded a convenient means of travel on the ice. Others frequently located in the vicinity of an Indian trail. As the number of settlers increased the trail became a bridle path, then a waggon track, and ultimately resulted in one of the many "trespass" roads of to-day.

The first serious attempt at road construction in Ontario was commenced immediately after the separation of Canada into the Upper and Lower Provinces in 1792, and was one of the chief considerations of Lord Simcoe upon his arrival as the first Lieutenant-Governor. At the first Parliament in 1793, a statute labor law was passed, in spirit very similar to the present law. Guided by his military ideas, which prompted him to see in the present site of London the future capital of the Province, in Chatham a naval dock yard, in Turkey Point and Penetanguishene, naval stations, he accordingly planned a system of military routes. When on one of his tours of exploration he stood on the present site of London, then known merely as the "Forks of the Thames," in the midst of

an unbroken wilderness, and proclaimed his intention of opening a road "straight as the crow could fly" to the Head of the Lake (Burlington Bay). Work was commenced on this road on September 10th, 1793, by a detachment of the Queen's Rangers. This was first called Dundas Street, but is now known as the Governor's Road. From the Provincial seat of Government, York, now Toronto, Yonge Street was opened to Lake Simcoe by troops, a work which was completed in February of 1796. It was the intention of Simcoe that the road through the Province from York to Kingston should be opened by the settlers, and travel from the latter place to Montreal was for a time to be by water. Had Simcoe remained as Governor, it is altogether probable that the work of opening roads would have been carried on more energetically, but with his recall in 1796 ended very largely the era of military construction.

The *Canada Constitution* of September 13th, 1799, contains a reference to the settlements of that period between Burlington Bay and the Thames, in which it says :—

"The settlement from the head of the lake began about four years ago, excepting the Mohawk village; in this period townships have so far increased in population and cultivation that there are several neighborhoods at convenient distances until we come to the mouth of the La Tranche or Thames. . . . These settlers being aware of the importance of roads in raising the value of their property, early set about to open and extend them; notwithstanding the numerous discouragements, and the immediate necessities of their families, they, in one year, at the expense of Mr. Ingersoll, cut and bridged a road from Burford to La Trenche, through a wilderness of twenty-five or thirty miles. This was done previous to the escheating of the townships. Mr. Elijah Putman, of that town, (Oxford), by subscription, has since continued the road thence thirty miles to Allan's (Delaware) township. Here is a villa, and a church raised and now finishing by Mr. E. Allan after the model of that at the Mohawk village. The subscription being very inadequate to completely finishing the work, it was left unfinished but passable for sleighs. He has been by no means discouraged, but issues a subscription to cut a road from Allan's to the Moravian Grant, a further distance, as it must run of fifty miles, to be ten feet wide, and the logs laying crossways to be cut twelve feet long. Without waiting the issue of the subscription, and relying on the patriotism of his neighbors and gentlemen in other parts of the Province who hold lands upon the river, he began and has already opened half the distance, and promises, if the liberality of his friends be equal to it, that he shall immediately complete the whole. The Moravians will extend it seven miles when it shall form a junction with the old road, from whence there will be a good wagon road forty miles to the mouth of the river. Thus we shall have by the ensuing winter a land communication with Detroit and not a day's ride without settlements. Such is the enterprise of our western inhabitants, that one hundred and fifty miles is made without the least allowance from the Government."

The foregoing chronicles the origin of the present London and Hamilton Gravel Road and a portion of the Longwoods Road. It is altogether probable that the former followed in part, the famous Indian trail leading from Burlington to the Thames. The forest along the Thames, from which the Longwoods Road derived its name, extended thirty-five miles westerly from Delaware. This road was improved by troops during the war of 1812-15 so as to permit the transportation of military stores and artillery.

The location of most of the early roads has been very much altered from time to time for the purpose of straightening them or to avoid hills or fords. Thus in 1831 the Longwoods Road was altered in Ekfrid so as to avoid six fords on the Ten-mile creek and two on the Eighteen-mile creek. A map contained in the "History of Scarborough," by David Boyle, illustrates the many changes which have almost imperceptibly taken place in the route of these old trespass roads.

The Danforth road was one of early prominence. Of it, the *Gazette* of April 13th, 1799, says: "The contracts for opening the road between this place (Toronto) and the Bay of Quinte are entered into; the road will be thirty-three feet wide, creeks will be bridged, swamps, etc., will be causewayed, the whole to be completed by July, 1890. A circumstance highly beneficial to the town, and what ought to draw from the inhabitants

the warmest expression of thanks to the Government, as the expense is paid by it." Again the *Gazette* of December 14th, 1799, contains the following: "The road from this town to the Midland District is completed as far as the township of Hope, about sixty miles, so that sleighs, wagons, etc., may travel it with safety. The report which has been made to the Government by the gentlemen appointed to inspect the work is highly favorable to Mr. Danforth, the undertaker, and less imperfection could not be pointed out in so extensive a work. The remaining part will be accomplished by the first of July next." Tradition says of the very crooked line followed by the Danforth road, that Mr. Danforth, being paid by the mile, wished to make the road as long as possible. It is more probable, however, that it followed the irregular windings of an Indian trail.

The road from Toronto to Burlington Bay through the Mississauga Reserve, was for many years merely a trail and difficult to travel. With the opening of Dundas street this trail was lost, but the location is roughly indicated on a map attached to an Indian treaty. This, with the Governor's Road and the Longwoods Road to the west, and the Kingston Road to the east was esteemed an important trunk line through the Province; and with Yonge street to the north, and the road around the head of Lake Ontario to Niagara, were the most important of the early roads.

The roads between Burlington and Niagara was interrupted by the "Black Swamp." A subscription list was opened with considerable success as the following announcement from the *Gazette* of March 15th, 1798, indicates:

"The trustees respectfully inform the subscribers and the public at large that there are 387 rods causewayed and 240 only remain undone, which at one and one half dollars will make 360 dollars. Thus that tremendous Black Swamp bridge, that has been estimated at so many thousand dollars and calculated to take up so much time, has been nearly two-thirds done in about one month, that too in a severe winter. Upper Canada cannot boast a work of the kind so far advanced in so short a time. Three hundred and fifty dollars more, gentlemen, and the work is completed. The money that has been subscribed being all expended, the trustees hope the subscribers will be good enough to pay into the hands of either of them, their respective donations, and further donations will be thankfully received and carefully expended."

By 1796 there were roads from Montreal to Lake Francis, and from Cornwall to Prescott. The intermediate stage of about fifty miles was travelled by boat owing to the wet water-front in Glengarry, and the consequent difficulty of constructing a road. As late as 1807 the mails were carried from Montreal to Toronto, Niagara and Amherstburg by pedestrians who carried an axe to assist them in the journey. In 1816 the first stage was run between Montreal and Kingston, and in 1817 a stage ran between Kingston and York. This, however, was only in the winter, and during summer navigation the stages were discontinued. In 1826 the first stage passed between Niagara and Toronto, and in 1828 a stage route was established between Ancaster and the Detroit River.

In the early history of Ontario, certain provincial roads, such as the Talbot Road, the Sunnidale Road and others, were laid out and administered by the Surveyor General. A great number of the roads first surveyed are supposed to follow the lines of Indian paths. The first Roads Act was passed in 1803. Under this, commissioners were appointed by proclamation of Lieutenant-Governor Peter Hunter, to have charge of their construction and maintenance. By an Act of 1810, that of the 1803 was repealed and the quarter sessions given control of the roads. Colonization roads as now understood were first authorized by an order-in-council of 1848, to be constructed under the Commissioner of Crown Lands.

The first statute labor law of 1793 provided that every landholder or free-holder might be required to work on the roads from two to twelve days, as directed. This was soon found to be unjust, as landowners possessing an entire township were in this way taxed no more than a person owning a few acres. After a few years, a scale was arranged according to assessment, which was afterwards varied from time to time. The work of opening roads was retarded for a time by the clergy reserves, also by the absentee landowners who were not at first required to perform road work.

An Act of 1829 authorizing the formation of the Dundas and Waterloo Turnpike Co., was the first Toll Road Act. The Joint Stock Companies' Act of 1849 greatly fostered this principle and permitted many of the main roads to pass into the hands of private companies to be operated as toll roads. Before the union of the Provinces in 1841, a considerable part of the revenue was spent on roads and bridges. It was estimated in 1840, by Chief Justice Robinson, that £200,000 had been thus appropriated. The system of making provincial grants was abused, however, dissatisfaction was created, and it was found necessary to place the roads entirely under municipal control.

Attention began to be diverted from roadmaking by the construction of canals, the first canal, the Welland, being opened in 1824. The railway legislation of 1849-52 whereby over 1,300 miles of railway were, before the close of 1860, built and equipped at a cost of about one hundred million dollars, also withdrew a great amount of energy from highway construction.

The first roads opened were usually so obstructed by stumps and logs that they were merely winter roads, passable only for sleighs, when deep with snow. The troops, in opening the Governor's Road, chopped off the stumps close to the ground with an adze. Col. G. T. Denison, sen., when opening Dundas street between Toronto and Burlington, took the more radical course of tearing the stumps out by the roots. The Goderich Road opened for a distance of about one hundred miles through the Canada Company's lands was regarded by Sir John Galt as the one undertaking of which he might be proud. The cost of this work was $5,000, no inconsiderable expenditure in Ontario at that time. In 1825, William Lyon Mackenzie described the road between Toronto and Kingston as the worst human foot ever trod. The Talbot Roads were commenced shortly after the coming of the Hon. Thomas Talbot in 1803, and, extending ultimately along the north shore of Lake Erie from Niagara to Detroit, became noted for their excellence.

Excellence at that time, however, was not what would be now regarded as such. The corderoy road on low and swampy land was the common means of overcoming the absence of drainage. The spaces between the logs were not always even filled with earth, so that the legs of horses were occasionally broken. Roads between dense walls of forest which shaded the roadway and kept it moist, the roadway itself composed largely of vegetable mould—such conditions could not but produce the discomfort and hardship experienced by the early travellers. It was only when the corderoy roads, the bogs, stumps and logs were covered with snow, that journeys could be made with comfort. When the frozen rivers could be travelled with sleighs, the height of luxury in Canadian travel was obtained.

A review of the development of roads in Ontario draws attention to the fact that they have by no means been built by statute labor alone. The pioneers, as a part of their settlement duties and quite distinct from the statute labor, were required to clear the road allowance of trees and remove sufficient stumps to permit a wagon to pass. It was as easy to built the corderoy roads where needed as to adopt the remaining alternative of burning the logs. The stumps not taken out as part of the settlement duties in providing a wagon track, were left largely for time and nature to destroy. The necessity for roads was so urgently felt, that labor and money were voluntarily subscribed, as instanced by the London and Hamilton, and Black Swamp roads, to which reference has been made. The regular troops and militia was employed in opening and constructing roads. The Canada Company opened a number of important roads through the Huron tract. Extensive provincial grants were made from time to time for opening new roads, and for the improvement of roads already opened. Later, many of the main highways became toll roads, maintained by private companies, permitting the municipalities to withdraw the statute labor from them and devote it to the less important roads. Since the roads have been under local control, they have been the object of large and constantly increasing annual money appropriations from the township and county funds. The road improvement which can reasonably be credited to the statute labor system consists mainly of a little grading and a little gravelling, neither of a very high order. So that, for the construction and maintenance of highways in this Province, we have been very much less dependent upon statute labor than is now popularly supposed.

PART II.

TOWN STREETS.

STREET IMPROVEMENT.

The improving of town streets is a question of considerable importance. The majority of the citizens of every town, the best and most progressive men of the community, understand the value of improving the appearance of private residences and lawns, their places of business, the churches, halls and public buildings. Work of this description is unfortunately handicapped in most Ontario towns by the neglected condition of the public thoroughfares. Instead of furnishing, as they should, an incentive to the improvement of private property, they are a constant object lesson in shiftlessness. Improved streets quickly pay for themselves in the encouragement they give to the making of better lawns, and the erection and better maintenance of houses. Well made roadways with boulevards nicely sodded and levelled, sidewalks in good repair, fences removed and trees abundant, give an air of prosperity to a town which is a constant source of pleasure to the citizens, and most favorably impresses a visitor.

A street properly constructed, and paid for in say ten years, is by no means a worn out property. The boulevarding, the grading, the draining and the foundation should be as good as when first constructed. It will remain merely to keep the surface in repair. A street designed on proper principles is, in its ultimate cost, a measure of economy, and will in the end decrease taxation. There are those who ask what revenue is to be derived from street improvement. If the increased property value is not sufficient, the same argument will largely condemn waterworks, sewers, sidewalks and almost any other public work. So long as streets are necessary it will pay to build them well. The majority of people still form their opinions from external appearances. A man's character and influence are largely judged from the house he lives in. On a larger scale a town is subject to the same criticism.

The majority of towns in Ontario pay for work on streets by making annual appropriations from the general funds of the municipality. The amount varies greatly with the different towns, according to the size, wealth, requirements and liberality in this respect, ranging usually from one to ten thousand dollars. This money is distributed over the town in several ways. In some cases it is sub-divided among the wards; the basis of this may be the assessed value of the property in each ward, or it may depend on the skill of the ward representative in wire-pulling. In other cases the ward boundaries are overlooked and the money is divided as the council may deem advisable; in this instance, influence is usually brought to bear directly upon the council by individual citizens or bodies of citizens.

In whatever form, the final tendency of this method of making expenditure invariably is to scatter the appropriation over the whole street area, not in accordance with the actual improvements needed, but according to a councillor's idea of equity, modified by his desire to retain or gain the support of his constituents. The manner in which the appropriation is spent makes it a sort of legitimate election fund; the people expect it and the council has no other course to pursue. The character of the work done is merely temporary patchwork, an effort to keep in repair mud roads and gravel roads which have never been suitably built. No durable improvements are attempted, and the plans are

usually those belonging to townships, as they are commonly developed by a bad phase of statute labor. While such roads are the cheapest in first cost, they are the most expensive to maintain.

It is impossible to condemn in a manner too pointed, the inefficiency of this system of providing for the improvement of streets, a fact made apparent by their wretched state. It is difficult to find a township, with a scattered and scant population, which has worse roads than the average town, notwithstanding the greater ability of the latter to pay for the proper construction of a comparatively short street mileage. A good system of street management must embody two ideas:

(1) Capable oversight, so that work will be performed on proper principles of construction and in accordance with carefully prepared plans.

(2) The concentration of funds so that work of a permanent nature can be undertaken.

In accordance with the foregoing, the first requirement, in the most of towns, is a capable street overseer. He should possess a good knowledge of the principles of road and street construction. Whenever work is to be undertaken, he should first report on it to the street committee, or Board of Works, with plans and specifications. The committee having rejected, accepted or amended this report, the council should sanction or discard it. Work should be carried out under the direct supervision of the street overseer, preferably by contract labor, if the extent of the work warrants it. The overseer should be in constant touch with the chairman of the Board of Works, and should be available at all times for consultation, attending all meetings of the board for this purpose. The necessity of such an officer has been pointed out in connection with township work. His position should be as secure as that of the average clerk or treasurer. Work left to the direction of councils and councillors, with their conflicting interests and ideas, cannot be efficiently performed.

If the system of making annual appropriations is adhered to in carrying on street improvement, the disposition of the money should be such that a certain amount of permanent roadway will be built every year, devoting the smallest sum possible to repairing unimproved streets. This, however, is not the business-like policy, the policy on which great enterprises and improvements have been most successfully and economically brought about.

One man never undertakes to build and pay for a railroad, but a company is formed, bonds are issued, the money obtained to be paid back in the course of a number of years. The work as soon as finished is an asset, to be balanced against the bonded indebtedness. The company which manages and directs the railroad expects it to earn a sufficient revenue to keep itself in repair, and to ultimately pay for itself. This is the method whereby all our greatest and best business concerns have been built up. It is the only method whereby permanent and durable results can be economically obtained. This is the method adopted in establishing municipal waterworks systems, electric light and sewer systems, and is quite as necessary in street improvement. The annual taxes should be used to pay for the interest, for maintenance and to create a sinking fund to meet the principal when due. Improvements made and maintained in this way are not a direct financial loss. But these improvements are an asset to be placed to the credit of the town, to be balanced against the bonded indebtedness just as is the case in the construction of railroads. A town which owns a public hall worth $20,000, as a corporation is none the poorer because it is in debt to this amount for its construction. The hall is an asset, placed to the town's credit, and balances the indebtedness.

In assessing the cost of these improvements the annual payments may be met by the general funds of the town, in which case, in order to render justice to all, it would be necessary to raise sufficient money to suitably improve at least the most important streets of the town; or a local improvement by-law may be adopted, this being usually framed on the frontage assessment system. Further reference to this system will be found in the appended report to Woodstock. The Municipal Act provides for this system in sections 612-628.

The principle of paying for a public work immediately on its completion is not a just one. The benefit derived from improved streets, a town hall, a sewer system, has only commenced when the work is completed. This benefit extends over a term of years and the only fair system is to ask payment from the citizens as the benefit of the work is received by them.

Nor is the full benefit of street improvement derived when only short sections of street are constructed annually. It is not until the whole town is provided with well designed thoroughfares that the full benefit commences. Short sections are merely scattered links of a chain; the usefulness of the chain is not realized until all the sections are joined, to the full length required. The "pay as you go" system is not the most profitable, if under it the work can be performed in limited sections only.

CHOICE OF PAVEMENTS.

The principle of economic fitness between the paving material and the wear to which it will be subjected, is an important consideration in designing streets as well as country highways. We have to consider the character of the natural soil on which the metal is to be laid—whether loose and porous, or retentive and difficult to drain; whether a light sand or a dense clay; whether stony or close to bed rock. We have to consider the qualities which the traffic over the road will require of the pavement; we must consider the availability of material for surfacing the road, whether economy advises the use of the metal at hand, or the bringing of a more suitable material from a distance.

All kinds of pavement are good when laid in the right way and in the right place. It is useless to condemn without proviso any one variety of pavement, for however defective it may be found under one set of circumstances, under other circumstances it is altogether probable it would be the most economical and serviceable that could be used. Cedar block is commonly looked upon as an entire failure for paving purposes. Cedar block has failed in a great many instances on account of the weak and undrained foundation on which it was placed. It has failed in other instances on account of the poor material used. In other cases it has failed by reason of a damp and unfavorable climate. It has failed frequently because of the excessive traffic to which it was subjected. While the use of cedar block is not advisable to any great extent in Ontario, yet it is easy to conceive of a dry climate, a loose, porous sub-soil and other facilities for securing a good foundation, an abundance of choice material close at hand, all of which would go far to render cedar block the most desirable material in that locality.

Macadam is pre-eminently the favorite pavement among horsemen, and if properly built is considered by many to be equal in appearance to asphalt. In hot weather it is scarcely possible to subdue the dust on an asphalt pavement by sprinkling, but Macadam can easily be kept moist. Macadam should in Ontario supplant asphalt on residential streets where the traffic is not too great. Brick is not, in appearance, equal to well kept macadam, and should be used on residential streets only when, for economy, a stronger pavement is required, and when the handsome effect of asphalt is not required.

One is sometimes asked for an expression of opinion regarding the relative merits of brick and asphalt, irrespective of the traffic, the climate and other matters affecting their durability. The only reply which one could give to such a question is, that both are good; or to look at it from the other standpoint, both are bad. Brick pavement appears to be the ideal pavement for the business streets of towns and smaller cities. The cost is from one-third to one-half less than asphalt, is not objectionably noisy, does not decay readily in a moist climate, and will support a considerable weight of traffic.

Asphalt is suitable for a business thoroughfare, where a slightly stronger pavement than brick is needed to support a somewhat heavier and more constant traffic. It is suitable too, for a residential street on which there is too much travel to permit the laying of a macadam pavement and where a more costly effect is desired.

The streets of towns in the immediate business portions are subjected to wear not imposed upon residential streets. If broken stone roadways are retained on business streets the gutters should be cobblestoned to protect them from the feet of horses when tied or standing close to the curb, and a covering of one foot in thickness should be used over the whole surface. Macadam is not the most desirable material however, for this class of street. A pavement is needed which will not absorb street filth, which can be readily cleaned, which will not be dusty, nor muddy.

The choice of pavements for the business streets of towns and cities of Ontario appears to rest at present between asphalt and brick, the former so far obtaining the preference. Cedar block should be used so rarely that it need not be considered in a general discussion of the subject.

Asphalt.

Asphalt is more noiseless than brick, is smooth, sanitary, and presents a good appearance, but it is not the ideal pavement, in all respects, that it was at one time supposed to be. In summer its smooth, stony surface radiates an intense heat; any amount of sprinkling cannot keep the surface moist so as to allay the dust, while the glare which it reflects on a bright day becomes painful to one driving or walking over it. The wet weather of fall and spring in this climate keeps an asphalt pavement in a very slippery condition, unsafe for horses, while at any time the foothold is insufficient.

The most common causes of the failure of asphalt are found to be weak foundations, which, settling, permit water to stand in hollows on the surface until the pavement is rotted; tearing up the pavement for sewer connections; surface cracks, caused by contraction in cold weather; insufficient traffic and excessive traffic. The destruction of asphalt arises more from atmospheric effects than from wear, a certain amount of traffic being beneficial rather than detrimental.

Asphalt is seldom worn out by too much traffic, the decay generally arising from other causes, some of which have been enumerated, and which the specifications should rigidly guard against as far as possible. A good asphalt pavement should be maintained by the company building it for seven years, and at the expiration of that time delivered to the municipality in perfect order.

Vitrified Brick.

The only competitor of asphalt is vitrified brick. This pavement has come in a most timely way to take the place of the decayed cedar block pavements which are disgracing the streets of so many towns and cities. Vitrified brick is becoming popular, and presents features which tend to cause it to become more so. It offers a better foothold for horses than does asphalt. The surface is not so smooth, and in consequence radiates less heat and light, is quite as sanitary, with less liability to become dusty. Among bicyclists it is much more popular than asphalt. If the joints are filled with suitable cement, brick pavement is but little more noisy than asphalt.

The majority of failures which have occurred with brick, have been traced to defects which the material or better construction could have obviated. Its ease of construction and repair offers a great advantage over asphalt, ordinary laborers being easily taught to do the work. Few repairs are needed if good brick is used, and in the first cost as well as in maintenance, brick should be, and generally is, cheaper than asphalt.

Although brick is one of the oldest paving materials, it has been used on this continent for only about a quarter of a century; and only within the last ten years has it attracted widespread attention. In the United States, it has been used very extensively, but in Ontario, experience with the modern vitrified brick is very limited.

Of its success as a paving material little remains in question. Brick pavements have been in existence in the United States for eighteen years, remaining in good condition. It was feared that the climate of northern countries with severe frosts and rapidly alter-

ating conditions of moisture and temperature, would be unfavorable to its use, but the experience of various northern cities shows that vitrified brick of a good quality is a most valuable addition to our list of paving materials.

The best vitrified brick is made of shale or clay, or a mixture of the two. It is not "vitrified" as the name indicates, but is raised by intense heat just to the point of fusion. More than this fuses or melts the clay, permits it to run together and the product is then glassy or vitrified, and brittle in consequence. The process of cooling must be very gradual. A brick if too rapidly cooled or "annealed," will be brittle, but with a thoroughly pulverized and well-mixed shale, brought to the proper temperature and then slowly annealed, the resultant brick should be sufficiently hard and tough to scratch steel.

The chemical composition is a matter of importance. The chief defect is likely to arise from too much lime. Brick which contains an objectionable amount of lime, or other soluble substance, when immersed in water for three consecutive days, and then kept in a dry atmosphere for a corresponding length of time will show signs of spalling and pitting, and indicate a faulty composition of the clays of which they are composed.

When broken, brick should show a smooth and straight fracture, and the texture and color should be uniform throughout. A granular appearance is very objectionable. Bricks externally should be smooth and straight, not warped, and should be free from fire cracks and checks.

Brick should absorb the least possible amount of moisture. A large amount of water in brick, freezing, has a bursting effect which in this climate cannot be guarded against too carefully. A good brick will not absorb more than two per cent. of its weight in water. To absorb three per cent. may be permissable if in other respects it reaches a high standard.

The quality of brick is fairly well shown by the rattler or tumbling barrel test, as this most nearly approximates to the wear from the blows and chipping of horses feet. A tumbling barrel or rattler consists of a cylinder about three feet long, and two feet in diameter, placed on a shaft. Samples of the different makes of brick are first weighed and are then put in the barrel, together with from 150 to 300 pounds of scrap iron in from two to eight pound pieces. The rattler is then revolved for two or three hours at the rate of about thirty revolutions per minute. The comparative loss in weight will indicate the relative efficiency of the brick in resisting this class of wear.

A valuable test is that of transverse strength. In this the brick is laid upon two knife edges, placed about six inches apart. An upper knife edge centrally between the two lower blades is slowly brought to bear on the brick, and the weight required to break it is carefully noted.

Other tests are sometimes used, to determine crushing strength, the depth to which oil will penetrate the surface, etc. The specific gravity of a brick is valuable as indicating density, and therefore the extent of probable absorption. The chief tests, however, are those above described; that of absorption, representing the probable effect of atmospheric action; the rattler test, showing the effect of impact and abrasion as found in the chipping of horses hoofs and the grinding of wheels; the transverse strength, showing the power to resist the breaking strain of heavy loads. Where, in towns, the facilities for performing these experiments are not available, and only short sections of pavement are to be constructed, the experience of cities will generally afford a safe guide in choosing between different makes of brick. A further safeguard may be had by requiring the contractor or manufacturer to maintain the pavement up to a certain standard for at least five years.

There is a tendency to endeavor to reduce the cost of brick pavements by the use of a weak foundation or no foundation at all. Brick pavements laid on gravel and sand have been successful, but this has been the case only when the subsoil has been of such a kind as to be very porous, easily drained, and naturally firm. The experiment in Ontario, in view of fall and spring conditions with alternate freezing and thawing, is a very dangerous one, a lesson which has been strongly impressed by the experience with cedar blocks.

While a brick pavement may give satisfaction for a few years on sand and gravel foundations, there is every probability that the brick will settle irregularly, and, rendered thereby more susceptible to wear and strain, the bricks will be broken and the life of the pavement very much shortened.

A concrete foundation should almost invariably be employed. A four inch layer will, where a brick surface is suitable, be sufficiently durable. This forms a stiff monolith base which distributes the weight of traffic. There cannot be irregular settlements of brick, as is the tendency with yielding materiels, such as sand and gravel. It also prevents water percolating beneath the road, not a very important feature in the south, but in freezing climates a matter of considerable importance.

Between the bed of cement and the surface covering of brick a thin cushion of sand is necessary. By this means the brick can be laid evenly, a certain amount of spring is obtained which lessens the effect of blows on the brick, and it overcomes the rumbling noise otherwise created. It is a common practice to merely fill the joints of the brick with sand. While this is not at all objectionable, by the use of a cement composed of pitch and sand the pavement becomes less noisy, absorbs less street filth, and corners and edges of the brick are strengthened.

MACADAMIZED TOWN STREETS.

There is a common impression that macadamized roadways are all very well for country highways, but that, for town streets, a higher grade of paving material, brick, or wood, or asphalt is necessary. This opinion, so adverse to macadam, has no doubt arisen from the common practice of terming a "macadam" road, any allowance between concessions that has had an irregular layer of gravel dropped along the centre. This was somewhat the idea the people had of roads before the time of Macadam, the main feature of whose road-making, however, was a firm, unyielding sub soil, maintained in that condition by a thorough system of deep drainage: and a covering of stone, impenetrable to moisture and so shaped so as to shed water quickly to the gutters. All kinds and classes of paving have their proper place, and, in its proper place, there is none more serviceable or capable of giving greater satisfaction than Macadam.

Residential Streets.

One place in which macadam can be rightly employed is in paving certain town and city streets—those of a residential character, not subjected to traffic so great as to render the maintenance of macadam excessively expensive. There are, of course other limitations which individual cases will suggest. Business thoroughfares, or a street in its business section, requires a less absorbative material, and one which presents a smoother surface, more easily cleaned. With horses standing, moving slowly, tied and pawing as so frequently is the case on a business street, and generally with an excess of heavy traffic, a macadam pavement retains a great amount of street filth, is difficult to maintain, and should be, if possible, replaced with vitrified brick or asphalt. A well kept macadam driveway is in keeping with well kept boulevards, lawns and shade trees, the characteristics of a residential street; it has a cool appearance, the dust can readily be kept down by sprinkling, and for light driving is the favorite among horsemen. Bicyclists, now an important section of the community, usually favor macadam, in preference to the more costly classes of pavement. A comparison of macadam with asphalt or vitrified brick, in point of utility and beauty, will not result unfavorably to the former.

Grades and Earthwork.

Preliminary to undertaking the improvement of town streets, levels should be taken on all the streets to establish a system of grades which will provide a proper union of street intersections. Care should, of course, be taken to equalize cuts and fills as far as practi-

able, and to utilize surplus earth in filling up the boulevards or low lots adjoining the street. In this, the handling of considerable earth is often necessary to obtain the best results.

In the finished street, it is ordinarily advisable to have the crown of the roadway at about the same elevation as the surface of the sidewalk ; and, in any case, the sidewalk should not be lower than the crown of the roadway. It will be necessary to excavate below this elevation in the centre of the allowance to provide for the reception of the road metal. The depth of this excavation must provide for the thickness of metal to be used, and for surface drainage.

Width of Roadway.

The present tendency is to narrow the width of the driveway. It is found that to occupy a 66 foot allowance with a four foot walk on each side, and to devote the remainder to the driveway, is a needless expense, both in cost of first construction and in maintenance. From 22 to 26 feet is, on the great majority of the residential streets of towns, ample to accommodate traffic. A broad driveway is very handsome, but so also are broad stretches of nicely sodded boulevard, ornamented with shade trees.

Sidewalks and Boulevards.

At present, on improved streets, we ordinarily find a row of shade trees outside the walk. In commencing the reconstruction of a street, it is generally advisable, if not necessary, to take up the sidewalk to permit a proper grading of the road allowance. When the earthwork is finished, the sidewalks may be placed immediately outside the row of trees, and the space originally occupied by it, sodded ; and if the fences are removed the strip is, in appearance, added to the depth of the lawn. This arrangement will usually leave a space for a strip of sod between the sidewalk and the carriageway. If this part of the boulevard can have a width of about two feet or more, it takes away a certain dusty, business appearance which the street would otherwise retain. The sidewalk should have a distinct elevation above the sod, sloping slightly toward the roadway, to provide for a proper drainage. The strip of sod between the walk and curb should have a fall toward the curb of six or more inches, and on a 24 foot roadway having a one foot crown at the same elevation as the walk, this will leave from six to eight inches of curb exposed.

The Crown.

The crown referred to above, about one inch to the foot, will seem to many, perhaps, excessive. This applies to the newly-made roadway and provides for settlement. Two-thirds of an inch is the convexity ordinarily adopted on newly-constructed English or French roads, but with the material available in most localities of this province it is not sufficient. The limestone, gneiss, field stone and gravel ordinarily obtainable in Ontario are not the most durable, hollows are apt to appear, dust accumulates, and unless there is ample fall for the water, it will be found lying upon the road surface. The tendency invariably is for traffic to use the centre of the roadway, and this is always increased with the narrower driveways. But in choosing between two evils it is better practice to provide ample crown. It is better that travel should be less distributed than that water should lie in pools on the road.

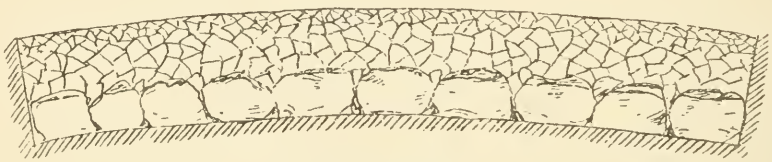
The shape of the crown has been a subject of some discussion. A circular rise is believed to be the best principle to follow in practice. Two planes, joined at the top by a short curve do not provide for settlements and wear. A flat ellipse, sometimes advocated, does not provide for settlement and gives an unduly steep fall at the edges increasing the wear at the side, and practically narrowing the roadway.

Curbing.

For curbing, flagstone, which is easily obtained in many districts, is the more handsome and more durable material. A good substitute is 3x10 cedar, which should be spiked to cedar posts $2\frac{1}{2}$ feet long and 6 inches in diameter. By bevelling the posts the curbing may be inclined at an angle of about 30 degrees. It presents a better appearance than when perpendicular, the tops of the posts are protected and there is less liability to decay.

Material.

In nearly every locality throughout the province good material will be found within easy distance. Crushed stone is usually regarded as the only material for macadam roads, but Macadam really used and advocated any material which would provide a good wearing surface not readily penetrated by moisture. Thus we have in Ontario a choice of gneisses, limestones, field boulders, pit and creek gravels; or if



CROSS SECTION.

Showing a broken stone driveway, with a foundation layer of flake-stone.

we wish the best material, trap rock is available. Of these materials we have all qualities, from that which is exceedingly good to that which is little better than clay. The gneisses are usually a harder and tougher rock than limestone, but the latter offsets this defect largely by better cementing qualities. Field stone makes a very good metal if care is taken in its selection. Pit gravel usually needs screening and crushing to remove sand and earthy matter and to reduce the large stones to suitable dimensions. Creek gravel is often sufficiently clean to be applied directly to the road but some attention should be given to breaking large stones In choosing the metal, a judicious selection must usually be made between a cheaper and poorer material in the immediate vicinity and an expensive but more durable metal from a distance. The selection will be based on the expenditure permissible and the nature of the traffic and the quality of stone used. Twelve inches is sufficient for the heaviest travel, and a thickness of seven inches is the least advisable. The coating should be heavier at the centre than at the curb. These measurements are after consolidation with a roller. A fuller discussion of this portion of the subject will be found in connection with country roads.

Binding Material *vs.* Rolling.

The use of binders is another question of considerable importance. The best that can be had is usually the clean chips and dust, the screenings of the metal used. The amount of vacuum in a surface covering consolidated without a binder is very considerable, but the mechanical grasp which one stone takes upon another under pressure is infinitely preferable to the consolidation obtained by a mixture of sand and stone. Sand attracts and retains moisture, while a vacuum will permit the water to pass away, at the same time providing space for the expansion of the frozen water retained. The action of frost on a clean metal is much less serious than upon a roadway having a temporary bond of sand. Rolling is an absolute necessity in obtaining a proper surface covering of crushed stone. Broken stone dropped loosely upon a roadway permits water to pass into the sub-soil as through a sieve and the process of consolidation under traffic not only results in a very great wear and tear of metal, but mixes it with the earth which of itself is very injuri-

ous and in so doing destroys the crowning and therefore the proper surface drainage of the roadway. The sub-soil should be crowned and, like the covering, thoroughly consolidated by rolling. The metal should be applied in layers three or four inches thick, each layer being thoroughly rolled before the next is applied.

The Roller.

The weight of the roller should be from ten to fifteen tons, the former generally producing the better results. An excessive weight tends to crush the metal, especially if of the softer local varieties, instead of working it into position. The heavy rollers produce consolidation more quickly, but the lesser weights have more permanent results. Less than ten tons is not advisable except in the instance of a horse roller, a cheaper but not very satisfactory substitute for a steam roller.

Underdrainage.

The necessity of underdrainage has been referred to fully in connection with country roads. The means must usually be common field tile. The location and extent of drainage must depend on various circumstances, the nature of the soil, the opportunity for outlets, and whether or not there is a sewer beneath the roadbed. Ordinarily a three or four inch tile placed beneath the edge of the roadway on each side, and below frost line, is the best rule to follow, but this, if the soil is loose and porous, and has a natural outlet for sub-soil water, may be more than is necessary. A line of tile placed in the centre of the road allowance disturbs the earth foundation, and settlements are likely to occur, a condition which is difficult to repair and is very injurious to the stability of the road.

Gutters.

If gravel or broken stone is used on a business thoroughfare, the gutters should be cobble-stoned to protect them from the stamping of horses; but on residential streets this is not necessary, the angle between the road surface and curb forming a sufficient waterway. Outlets for surface and sub-drainage must be procured as frequently as possible so as to dispose of the water before it gains force and headway. If a system of sewers exists, with provision for storm water, the matter is very much simplified. When necessary the water may be admitted to the sewer or tile drain through settling basins which should be very carefully guarded, to prevent obstruction.

The principles of road-making touched upon in this discussion of macadam streets for towns, will be found more fully developed in connection with the articles on country roads.

FORM OF SPECIFICATION FOR MACADAMIZING AND BOULEVARDING RESIDENTIAL STREETS.

In giving the following specification for macadam streets, it is not intended that it shall be rigidly adopted by any municipality. It indicates, however, the form which a specification should take, and may be modified to suit local circumstances.

Earthwork.

The excavating and grading is to be made to the depth and width shown on the drawing having preference thereto and to the levels given on the ground by the engineer or the person in charge of the work; and also to such greater depth and width as may be directed, to enable the curbing to be properly set; the levels and cross sections may be varied at the discretion of the engineer or other person in charge of the work, to conform to the elevation of lots and grades of intersecting streets.

The earth taken from the excavation for the roadway is to be used in properly grading up the boulevards and filling in any portion of the roadbed which is beneath the grade line on the proposed improvement; and the surplus earth is to be teamed from one point of the street to another as may be required in making the said boulevards, where there is not sufficient earth, and at any particular point in this excavation to complete the work; and the remainder of the excavated earth is to be deposited wherever directed by the engineer at a distance of not more than 1,500 feet on either side of the said street.

The Sub-grade.

The sub-grade when complete must conform truly to the required cross section as shown on the drawing.

Should the contractor, in grading, excavate below the proper level on the sub-grade, the deficiency shall be made up with gravel or other approved material well sprinkled and rolled at the contractor's expense.

Sidewalks.

The contractor is to carefully take up the present old sidewalk and crossings on the street, running in an east and west (or north and south) direction, and deposit the material ..... ; and the contractor, where required, shall take up all crossings over the streets running in a north and south (or east and west) direction and pile the material by the side of the intersecting street where it will be out of the way of travel.

The contractor is to excavate, or form in the excavated earth, a trench or opening for the sidewalk ..... feet wide and .... inches deep. The bottom of the said trench is to be level with the top of the line of the curb except where otherwise directed by the engineer.

All the sidewalks on the said street will be laid down by the contractor for that purpose; but the contractor for grading, etc., is to make the proper excavation as shown on the plan for said sidewalks, and after the sidewalks are laid the contractor for street grading must do any necessary filling or lowering of the boulevards in order to properly meet the grade of the sidewalk.

Boulevards.

The grade of the boulevard at the side of the sidewalk nearest the line of curb is to be six inches above the top of the line of curb. The boulevard between the curb line and the place made to receive the sidewalk is to be regularly bevelled off from the grade line at the top of the sidewalk to the top of the curb. The boulevard between the sidewalk and the street limit is to be regularly and evenly graded by cutting down or filling in as may be required, so as to conform to the grade of the sidewalk, except where otherwise directed by the engineer, in order to conform to the elevation of the lawns along the said street. The boulevards are to be left smooth by raking or otherwise levelling to the satisfaction of the engineer or other person in charge of the work.

Trees.

The contractor, in doing the work, must excavate or fill in around trees on the said street in a careful manner so as not to bark or injure the said trees.

Curbing.

Each side of the roadway throughout the whole length of the street is to be curbed with sound, live, white cedar, mill-made planks three inches in thickness by ten inches in

depth, and not less than twelve feet long, The posts are to be of round cedar, barked, good and sound, having a finished length of three feet, and to be not less than six inches in diameter. The posts are to be firmly set in the earth to a depth of two feet, centre to centre and cut off flush to the top of the curb. The planks are to be secured to the posts with seven inch wrought spikes, three spikes to each plank at each bearing. The planks must be neatly and closely joined, the joints to be made truly to the centre of the posts. The whole of the posts are to be set in an accurate manner, and true to the line and level given, and at such elevation as to show a face of ten inches above the subgrade, and with such incline from the roadway as may be directed.

At each street, lane, alley, private way, etc., the curbing shall, unless otherwise directed, be returned to the sidewalk, the returns to be placed at an angle of forty five degrees with the line of the curbing, each return to have a post where the curb meets the sidewalk. The earth at the back of the curbing is to be properly rammed so as to ensure stability of the curbing. The material and workmanship used must be in conformity with the specifications and plans, and to the satisfaction of the engineer, or other person in charge of the work.

Sewer and Waterworks Fixtures on Street.

Returns and off-sets, if necessary, must be made in the line of the curb around any of the water gullies on the street. The levelling of the top of the sewer gullies, manholes, etc, and the building up or lowering of all waterworks standpipes in such manner as the engineer may direct to suit the grade and crown of the roadbed, will be done by the contractor.

Private Entrances and Street Intersections.

All intersections of private lanes are to be properly made and graded in the boulevard by the contractor at a gradual slope from the top of the sidewalk to the bottom of the gutter, and all street intersections are to be graded to conform to the finished grade of the street.

Breaking up the Street.

The contractor is to break up the street in such lengths and at such points as may be directed by the engineer in charge of the work, and no part of the street shall be broken or torn up, or no portion of the old sidewalk removed, without the order of the engineer.

Work to be Continuous.

The contractor will be required to carry out the work continuously from the time of the commencement until the completion of the contract.

Right of Way.

The contractor will keep, if so ordered by the engineer, ten feet of the roadway nearest the curb open for use of the public from 7 a.m. to 7 p.m., and will keep the work properly barricaded and protected at night with lanterns.

Road Covering.

The surface of the roadway over the said road is to be covered with crushed stone to the depth of .... inches in the centre, and .... inches at the curb, to be regularly and perfectly spread over the whole of the roadbed to a depth to conform to the cross section shown on the drawings, and proportionate to that specified for the centre and curb. The crushed stone is to be furnished by ..... at .....

Placing the Metal.

The whole of the sub-grade, when levelled, shall be thoroughly rolled with a roller weighing ... tons, to be passed over the surface at least .... times. The roller shall be provided by ....., the work to be performed by the contractor. Crushed stone of a size to pass through a two and a half inch ring is to be placed over the whole of the surface of the sub-grade to a depth of .... inches in the centre and .... inches at the curb, and rolled with the said roller .... times; crushed stone to pass through an inch and a half ring is then to be placed over the whole of the surface of the road to a depth of .... inches in the centre and .... inches at the curb, and this rolled with the said roller .... times. A sufficient quantity of crushed stone of one inch in diameter, is then to be placed over the whole of the roadbed to bring it to the line of the finished grade as specified on drawings, this to be rolled by passing the said roller over it .... times. A coating of fine screenings is to be placed over the surface of the road and worked into the interstices of the mass of stone by thoroughly saturating and flooding with water, either from street hose or properly constructed sprinkling carts, and by passing a short harrow over the surface of the whole mass until the engineer is satisfied that the interstices are properly filled. The roller must be again passed over the whole of the road .... times, or to the satisfaction of the engineer.

Water.

During the whole of the rolling herein specified, a sprinkling cart is to pass immediately in front of the roller so that at all times the surface of the road will be saturated with water. The water is to be obtained from the street hydrants for which a charge of one cent per lineal foot must be paid by the contractor to the water commissioners.

Sod.

All sod on the street between the curb line and the line of the new sidewalk is to be carefully taken up by the contractor and neatly piled at one side of the work. After the boulevards have been built to the required grade, the sod is to be relaid by the contractor in a perfect manner.

Tile Drains.

The contractor is to furnish the tile and construct a four-inch field drain along the inside or roadside of the curb line on each side of the street. The tile is to be placed .... inches under the subgrade of the roadway, and after it is laid the trench made to receive them is to be filled in with the excavated earth to the surface of the subgrade, and thoroughly consolidated.

Extra Excavations.

Any extra excavations that may be ordered by the engineer will be paid for at the rate of fifteen cents per cubic yard.

Tenders.

Tenders are to be made in the form of a lump sum which will be taken to cover the cost of furnishing all necessary material (except stone), implements (except roller), labor, etc., of every kind to complete the work of grading, boulevarding and macadamizing the said street.

Payments.

Payments to the extent of .... per cent. of the work done each week shall be made by the certificate of the engineer, such certificate to be binding only as regards progress; and .... weeks after the completion of the work to the satisfaction of the engineer, the engineer will issue certificate for the balance.

APPENDIX.

TOWN REPORT.

To His Worship the Mayor and Members of the Council of the Town of Woodstock:

GENTLEMEN,—Having visited your town on the 19th of October last, in accordance with the invitation extended me, I drove over a number of the streets in company with the Board of Works, examined the methods used in their construction and maintenance, the system of management and expenditure, and beg to submit the following report:

ROAD EXPENDITURE.

Money for this purpose is appropriated from the general funds of the town to the amount of $2,000 annually. It is distributed among the various wards, and the sum given to each is under the control of the councillor representing that ward on the Board of Works. Under this system the effect invariably is to again sub divide the ward appropriation to such an extent that no work of a durable nature can be attempted. The people expect the amount to be scattered and the council has no other course to pursue. The system is fundamentally bad. Money is not spent in accordance with the requirements of street improvement, and the result is waste, extravagance and bad roads. An annual appropriation from the general funds for the repair of roads is found to work satisfactorily and equitably. To construct roads, however, under this method is practically an impossibility, as the expenditure cannot be sufficiently concentrated.

FRONTAGE TAX.

The most suitable remedy for existing conditions in Woodstock is the frontage tax system. When work is undertaken under it, money is raised by the issue of debentures extending over a term of years. The amount is assessed against the property abutting on the work, or benefited by it, according to the frontage of the lot, or according to its superficial area, or according to the assessed value of the property. Which ever one of these plans is chosen by the council should be stated in a general by-law submitted to the people for the adoption of the system. By means of the frontage tax system sufficient money can be raised to do durable, serviceable and economical work, and it is the most satisfactory method of consolidating road expenditure. Money thus raised is obtained at a very low rate of interest, and payment being extended over a term of years, the annual rate of taxation is small. The ultimate cost is no greater than under the old system of patchwork, the difference being that less money is wasted. The durable improvements obtained are at once a benefit to the individual property owner, the value of property is increased, and the town as a whole becomes a more desirable place of residence.

Under this system work may be undertaken in three ways: (1) On the petition of at least two-thirds of the property owners affected, representing at least one-half of the value of the real property benefited. (2) On the initation of the council, unless petitioned against by a majority of the property holders affected, representing at least one-half of the property to be benefited. (3) On the recommendation of the board of health for sanitary reasons. In assessing the cost, ratepayers are notified of the amount, etc., and courts of revision are held giving an opportunity to appeal, and to adjust any errors in the assessment.

As has been intimated, a general by-law for the introduction of the system should be submitted to the citizens, and should be sanctioned by a majority vote. In framing this general by-law very great care must be taken to adjust it to local circumstances as far as possible. When this is done, and the by-law provides for a just and equitable assessment, street improvement is invariably stimulated. To this end peculiar cases, such as corner lots, triangular or irregularly shaped lots, side hills and similar property should be taken into consideration; also the matter of street intersections, which are sometimes paid for by the property owners on the street, sometimes by the municipality. The frontage tax has in some cases unquestionably worked injustice, but when the by-law is judiciously framed there is no fairer way of paying for street improvement.

Direction and Supervision of Street Improvement.

In the direction and supervision of street improvement in Woodstock there are very serious defects. This branch of public work is in the hands of the ward representative on the board of works. There are five wards in Woodstock, and each member of the board of works is subjected to the possibility of a change annually. The result of such a system is that there is an entire lack of uniformity in street improvement. The work of one year is generally done without reference to the work of succeeding years, in view of which it may be rendered useless. Almost every street presents instances of this defect, in its sidewalks, its drainage, grade and road metalling. For economical and satisfactory results, there should be someone with a knowledge of the principles of road-making and street improvement over this branch of public work, who would examine, stake out and report to the board of works with plans and specifications; and works of importance should be let by contract. All work should be completed under the supervision of this official. He should be in constant touch with the chairman and board of works, and should attend each of their meetings for consultation. Even if all who have been members of your board of works had been expert road-makers, the constant change and interchange of plans would necessarily result in patchwork.

Wasted Labor.

A considerable quantity of gravel was being placed on Reeve street, High street, and a number of other streets at the time of my visit, but owing to the poor quality of the material and the method of placing it on the road, the expenditure is practically wasted. A quantity of broken stone has been placed on McQueen street. The sub-soil was not prepared so as to form a suitable foundation and the metal was scattered loosely over the road. Traffic will soon force the stone down into the mud and the result will be very unsatisfactory. A broken stone road built in this way is less serviceable than gravel.

Condition of the Streets.

The inefficiency of the system of expenditure and supervision employed in your town requires no other demonstration than the present condition of the streets. Gravel has been heaped on the centre of the road without reference to the objects to be attained in road construction. Very much of the gravel has been of an exceedingly poor quality. The drainage, where there is any, is crude and imperfect. The people have shown a disposition to boulevard the streets, but owing to the absence of a suitable curb line or established grade, these boulevards are undulating and irregular in width and elevation.

It is really a source of surprise that money, drawn from the pockets of the people, should be so long lavished in such a hap-hazard manner. To all other branches of construction, waterworks, sewerage, and public and private buildings, you have given serious consideration, but on streets the object appears to be to spend money. As with other enterprises, street construction, in order to obtain serviceable and economical results, must be treated as a matter of business.

Drainage.

Good pavements are largely a matter of good drainage. Not that the shape of the roadway, the material of which the surface is composed, or the way in which it is laid, are unimportant—but that these are very largely a part of the system of drainage. With the River Thames in the westerly portion of the town, and Cedar Creek passing through the southern portion, with natural depressions or watercourses leading to these streams throughout the town, admirable facilities for street drainage are afforded.

Underdrainage is one of the first points to consider. In making roads it is the native soil which must really support the weight of the traffic, no matter what paving material is used to surface it. Gravel, stone, brick or asphalt are not sufficiently strong to bridge over a wet and yielding subsoil. But if this natural soil is kept in a dry state it can support any weight, and to this end underdrainage is necessary. Underdrainage of common field tile, four to six inches in diameter, should be placed on each side of the carriageway underneath the gutters, and below frost, This "lowers the water line" and secures a good foundation.

There must be surface drainage and for this the roadway should be crowned or rounded up, covered with suitable surface material, and open gutters provided to carry away this surface water. The surface metal (gravel or other material) of course resists wear, but on streets which are lightly travelled the main object is to provide a cover which will prevent the water penetrating the natural soil underneath, making it unfit to support traffic. By crowning the surface of the road, water is shed at once to the side, where provision should be made to carry it away immediately in open gutters.

Gutters or under-drains are useless unless outlets are provided, and care should be taken to see that these do not become obstructed. Surface drains may have outlets into the tile drains through catch basins, or into the sewers, where capacity for storm water is provided.

Springs underneath roadways should be tapped with blind drains and the water carried diagonally to the underdrains at the side of the road.

Cedar street, a leading entrance to the town, receives a great amount of soakage water from the uplying land. A very large quantity of gravel has been placed on this street, but without a complete system of underdrainage the roadway can never be economically maintained.

Crowning the Roadway.

To secure perfect drainage the roads should be uniformly crowned or rounded. On the streets of Woodstock very little attention appears to have been given to this important matter, as on the majority of streets no crown whatever is made, while in one or two instances, notably Vansittart avenue, it is considerably above the adjoining property, driving the traffic to the gutters and making it almost dangerous to turn from the centre. On gravel or macadam streets this crown should be one inch of rise to each foot horizontal from the gutter to the centre; that is, the centre of a roadway twenty-four feet wide should be twelve inches higher than the outer edge. It is well to first establish the grade of the sidewalk and then make the centre of the roadway conform to this as nearly as possible, and with the same elevation. On hills the crown should be sharper, say one and one-half inches rise to one foot horizontal, so as to draw the water quickly to the gutters and prevent it following the wheel tracks, deepening them to ruts. Obtain the crown chiefly by rounding up the sub-grade or earth foundation, the remainder to be made up by the additional quantity of road metal placed in the centre of the roadway. Thus, for a roadway twenty-four feet wide, the crown of the sub grade should be nine inches, the remaining three inches to be secured by the difference in thickness of gravel between the centre and the sides. Care should be taken to make the crown perfectly circular.

Forming the Roadbed.

The practice in your town has been to pile gravel in the centre of the roadway on top of the natural soil, or to bring the earth from the gutters to the centre of the roadway, placing the gravel on top of this. This is the plan usually followed in grading township roads, but is totally unsuited to street construction.

The roadbed should be excavated to the required width to receive the gravel, broken stone or other material, and the excavated earth used in making boulevards or filling in the low lots to bring them to the grade of the street. The side of the street should be levelled to conform to the surface of the roadway. As far as practicable the crown of the finished street should not be higher than the adjoining property, but should conform to certain established grades.

Rolling.

I do not understand how the town of Woodstock can expect to build roads without proper tools. In examining the outfit of roadmaking machinery, I found it to consist of wagons to haul gravel and shovels to spread it, and two small stone hammers. The wagons and shovels belong to the workmen. Roads cannot be built without tools.

For economical, durable and serviceable road-making, a heavy roller is indispensible. A road should be sufficiently smooth and compact to shed the water readily to the side gutters. If the gravel or other road metal is dropped from the wagon loosely on a soft earth foundation, as is your practice, water passes into the subsoil as through a seive. Wheels passing over the road when in such a condition at once sink into and rut not only the gravel, but the earth beneath. Water is held in the ruts and each succeeding vehicle renders their condition worse. The road is less durable, since, the gravel being mixed with the dirt beneath, it obtains, when finally consolidated, a dusty, easily worn surface.

The weight of roller used must depend upon various circumstances—the amount of work it will be required to do, the quantity of road metal used, the strength of the bridges and culverts over which it must pass.

A steam roller costs much more than a horse roller, but does so much better and faster work that it is more economical. Municipalities surrounding your town would find it to their advantage to rent such a machine, thus keeping it employed, as it is too costly to remain idle. A weight of twelve tons does satisfactory work, and it is not too heavy for the majority of bridges.

Rolling should commence at the side of the road, approaching the centre gradually. If the roller is first passed over the centre the loose metal is crowded out and the shape of the road destroyed. It is best to roll the earth foundation in dry weather, and each succeeding layer up to the top dressing. When the latter is put on, the rolling should be continued in wet weather (or the metal thoroughly soaked from a hydrant or with an ordinary watering cart) until the metal is thoroughly compact and solid, able to resist, without displacement, the heaviest load passing over it.

Established Grades.

Without a complete plan of fixed grades it is impossible to do perfect work, and as far as practicable when any work is undertaken it should embody the whole street, both roadway and sidewalk. The grade of the street should be so fixed as to utilize all excavated earth in making boulevards, bringing the sides of the streets up to the grade and filling in low-lying property so as to conform to such grade. Without this it is impossible to fix a grade other than that which will conform to the elevations of the lots. One piece of street about half a mile in length was pointed out to me on which the sidewalks were constructed in six different sections under six different by-laws within the last four years, and without any road improvement being attempted. The effect is that a

different grade has been given for each piece of walk, the best that could possibly be given under the circumstances, but by no means as good as could have been given if the work had been carried out as a whole. Also streets are improved and graded without reference to each other. The result is that the intersections are very uneven, and are not only inconvenient, but have an awkward and unfinished appearance.

Slopes should in all cases be reduced as far as practicable, having due regard to the proper draining of water in the gutters, and having regard to the elevation of the adjoining property, for in fixing this grade it is bad practice to injure such property by excessive cuts or fills in front of it to satisfy a uniform grade of the finished road.

Curbing.

On each side of the roadbed it is advisable to place a line of flagstone curbing four inches thick and two and one-half feet in depth. A good substitute on residence streets is three inch by ten inch cedar plank. It should be spiked to six inch in diameter cedar posts, two and one-half feet in length, which are placed at intervals of eight feet and bevelled at the top so that the curb will slope slightly towards the boulevard. This curbing defines the roadway, protects the boulevard and gutters, and keeps the road metal in place.

Width of Pavement.

The usual width of your street allowance is sixty-six feet. This width is always advisable for sanitary reasons, besides adding greatly to the appearance of the street. It is, however, an unnecessary expense both in first cost and maintenance to have a wider driveway on residential streets than is necessary to accommodate the traffic. A broad carriage way is very beautiful, but so also are wide stretches of nicely sodded boulevard ornamented with handsome shade trees which are a notable feature of your town. Carriageways of from twenty to twenty-six feet are now being adopted on the residential streets of cities and are meeting with general approval.

Hills.

The Dundas Street hill and the Mill Street hill are in very bad condition. A large quantity of gravel has been placed on them, but no attempt whatever has been made to prepare the foundation, or to provide gutters. The course of the water is now down the centre of the roadway, the finer particles of gravel have been washed out and, in consequence, the large stones are exposed, forming a rough surface, checked and lined with crevices. Hills need very careful treatment. No water should be allowed to pass over the hill by the roadside other than that which falls on or exudes from the hill itself. Water from above the hill should be carried in underdrains, through private property, if possible, to an outlet. Neglect of this results in dangerous and expensive washouts. Gutters on hills should be protected with cobble stones from rushes of water. Where water oozes from the side hills or from land lying higher than the surface of the road, this soakage water should be intercepted and conveyed to the tile drains. It is good practice to fill the trench over tile drains with broken stone, gravel or other porous material.

Gravel.

My attention was directed to the gravel in three pits, Rapson's, one on Joint Street, and another on the north side of the town. The material in the two former is of a very inferior quality in its natural state, being very largely mixed with sand, earthy matter and large boulders. In order to be of service in road construction, material of this kind should be screened to remove large stones, sand and earth. A means sometimes adopted is to place in the pit a stone crusher with screen attachment, whereby the refuse is removed; at the same time the large stones are broken and form a very valuable part of the road metal resulting.

The gravel in the pit on the north side of the town is excellent. Much of it is fit for application to the road without any treatment other than to remove occasional large stones.

Cleanness of material is absolutely necessary. Sand and earth are very injurious to the roadway when mixed with gravel, as they attract and retain moisture and permit it to pass through to the sub-soil. A covering of this kind is not only less serviceable while it lasts, but is less durable than one composed of clean metal. Gravel should be placed on the road in layers of not more than four inches in depth, and each layer consolidated with a roller. The depth of gravel required on the street varies in proportion to the nature and extent of the traffic. On residential streets, little travelled, eight inches at the centre and five at the sides will be sufficient. Residential streets considerably travelled, with occasional heavy loads, will require nine inches in the centre and six inches at the sides. On other streets, largely travelled, ten inches in the centre and seven at the sides will be needed.

Broken Stone.

Broken stone is a much more durable material than gravel, providing, of course, that a suitable quality of stone is used. The best stone is that which is hard, tough and which will not readily decay on exposure to the atmosphere. The only stone to be had in the vicinity of Woodstock is field stone and river boulders. If these are crushed care should be taken to exclude rocks of a poor quality, the most common of which are "weathered" sandstones and granites. Some limestones also weather very rapidly. Slatey rocks are too brittle to be used on the road. There are heavily travelled streets in your town approaching the business centre which it would be well to pave with broken stone in place of gravel; and for preparing gravel and for breaking field stone, a stone crusher would be a very valuable machine for your town to possess.

The stone should be crushed and screened into sizes varying from one inch in diameter to two and one-half inches. The largest stone should be placed in the bottom of the roadbed and the smallest at the top. A road surface of a mixture of large and small stones, in time becomes very rough owing to the smaller wearing more rapidly than the larger, while large stones at the surface have a tendency to become loose.

The stone should be placed on the roadbed in layers and each layer thoroughly consolidated with a roller before the next is applied. The depth of the stone may vary, according to the traffic, from nine inches at the centre with six inches at the side, to twelve inches at the centre and nine inches at the side. As with gravel, it is very important that the material should be clean. No "binder" is needed with limestones. If an exceedingly hard metal such as trap is used, the fine "screenings" of the stone will be the best aid to consolidation. In rolling, the lower courses of stone should be perfectly dry, but in finishing the road, water may be used to flush a dressing of stone screenings into interstices.

Gutters.

When gravel or broken stone is used on business streets, the gutters should be cobble-stoned similarly to those on Dundas street, which were evidently well laid; but on account of tearing up to make sewer and gas connections they have become somewhat injured. In opening the streets for this purpose, great care should be taken in replacing the earth and pavement. Pipe for sewer, gas and water connections should as far as possible be laid by drifting with an auger large enough to accommodate the pipe, excavations only large enough to perform this work being made. On residential streets, the angle between the curb and the road-surface usually forms a sufficient waterway for surface drainage.

Vansittart Ave.

This avenue could be made one of the most magnificent residential streets in the province. It is 132 feet wide, the residences on each side are handsome, and the lawns surrounding them spacious, well-kept and tastefully designed. A very large amount of

THE RESULT OF RIGHT PRINCIPLES.

Increased property values, and, in ultimate cost, a measure of economy and decreased taxation.

MONEY SCATTERED AND MISAPPLIED.

Few back townships have worse roads than the average town.

A Rock-Crusher Needed.
Stone for fences but none for roads.

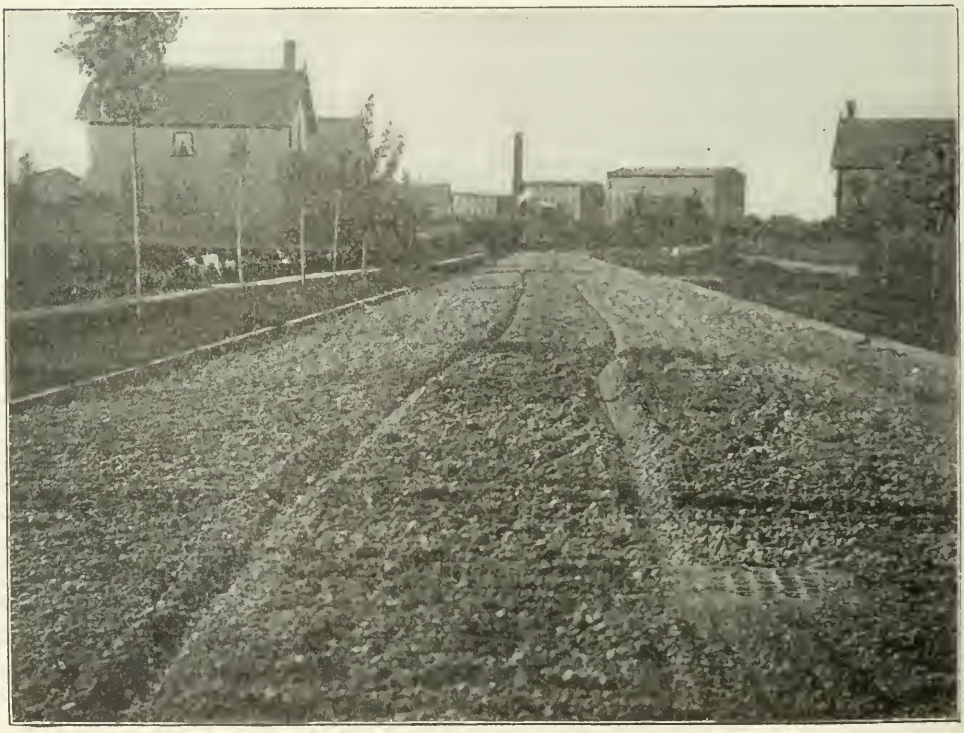
The Common Type of Hill.
Constructed without reference to drainage.

A Nicely Crowned Country Road.

After a Century of Road-Making.

The effect of narrow tires on a flat and badly drained road.

Sample Street in Orangeville



A Street which was not Rolled

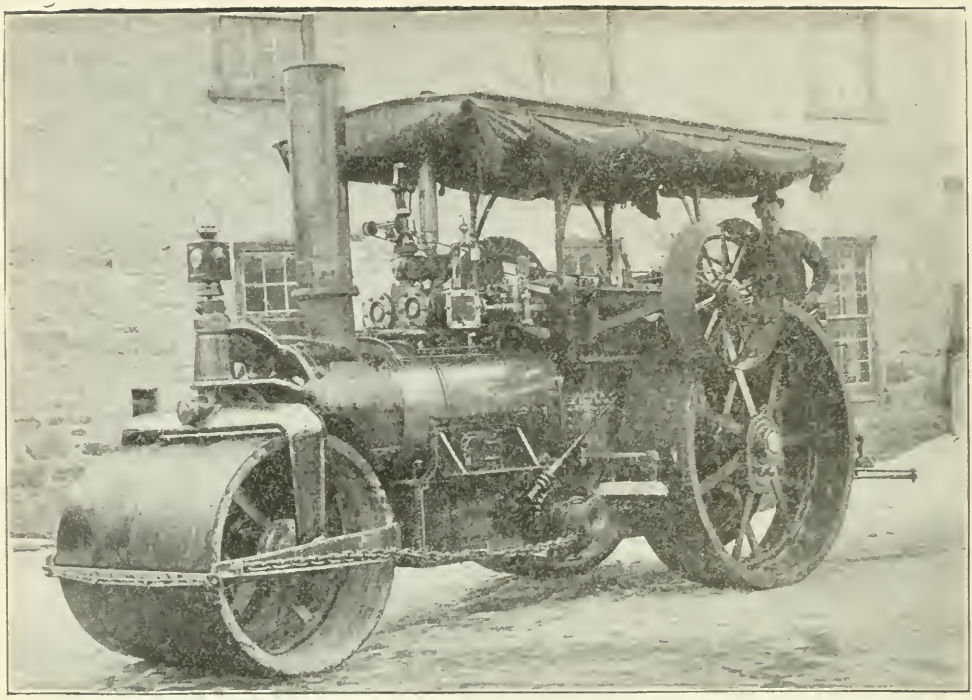
Street Improved in the Old Way.

A Street Well Rolled, Well Drained.

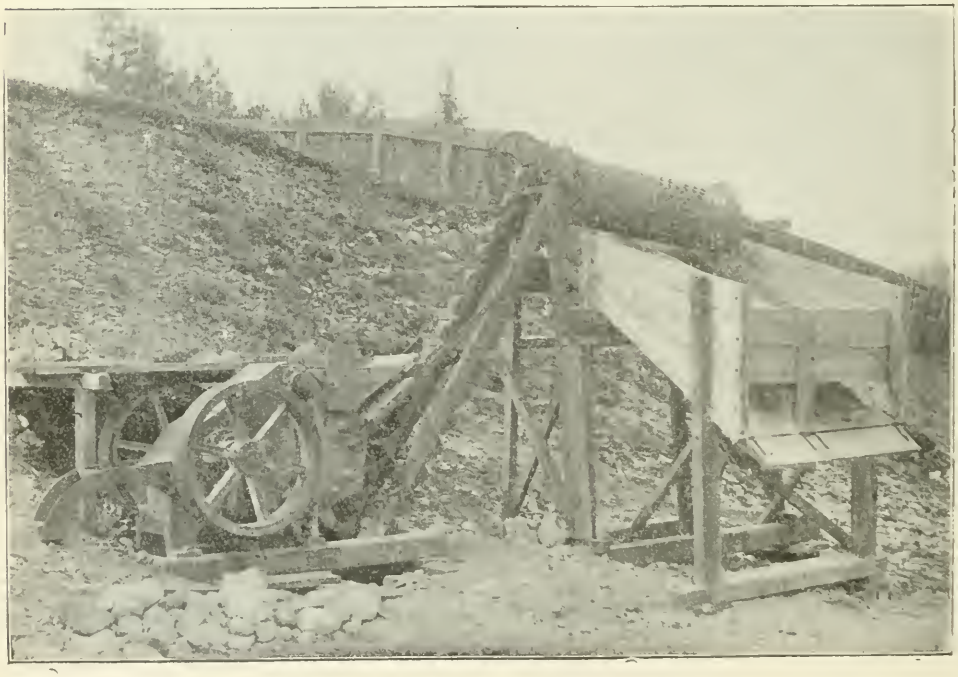
STONE BRIDGE—PEMBROKE.

Erected in 1887 over the Muskrat River, at a cost of $22,000. Height, 24 feet. Three spans of 60 feet each. Width of roadway, 24 feet.

Stone Bridge—St. Marys.



STEAM ROLLER.
The property of the Town of Galt.



STONE CRUSHER WITH ROTARY SCREEN ATTACHED.

money has been spent on the roadway, enough to have provided an asphalt pavement. Artificial stone sidewalks have been laid on each side of the street, boulevards made and neatly kept. But the dirty, imperfectly constructed and shapeless roadway is entirely out of keeping with its surroundings. While this street, on account of being a leading avenue, and on account of its exceptional width and beauty, attracted my attention specially, there are numerous other streets equally deserving of improvement.

Sidewalks.

Considerable attention has been given to the matter of sidewalks and they are now, generally speaking, in good condition. A large number of flag and artificial stone walks have been laid and add very much to the appearance of the town. The plan of laying the walks outside of the trees on residential streets has been largely followed, and is commendable. There should, however, be a narrow boulevard between the curb and the sidewalk, but, where there is not sufficient width of street allowance to permit of this, an exception should be made. If this boulevard does not exist between the sidewalk and the road, the beauty of the improvement is largely lost by giving the street a dry, dusty and business appearance, and frequently places the sidewalk so far from the trees as to be away from the shade. No sidewalk should be laid without a plan of the whole street being made, to show its location with respect to the roadway and other walks on the same street, in order to secure regular and uniform results.

Sewers and Sewer Connections.

Where a sewer is necessary on a street it should be constructed before the improvement of the road is undertaken; and as far as practicable all sewer, water and gas connections should be laid to the street line in order to prevent the breaking up of the roadway for this purpose. A macadam road cannot be broken up with injury, and the damage to a brick or asphalt pavement is correspondingly great. I would advise that special attention be given to this matter before Dundas street is repaved.

Dundas Street.

The life of the cedar block pavement on Dundas street is about expired, the material is decayed, has become uneven and rough, and must in a very short time be renewed; but although in this condition, it will, I presume, be used for another year, during which time your council should carefully consider the merits of the different pavements. Neither gravel nor macadam make a suitable pavement for the business thoroughfares of a town of the size of Woodstock. The pavement on Dundas street, in the business portions, should be surfaced with a much more durable material than either of these, a material which will be easily kept clean, so that it may be crossed at any point, will be sanitary, and will in every way give good service. A dirty, muddy, rough main street is certainly a poor advertisement for a town.

The qualities essential to a first-class pavement are:

(1) A secure and pleasant footing for horses.

(2) Smooth, so as to render travelling and traction agreeable, easy and noiseless.

(3) It should be sanitary; the form and material such that it will be impervious, liquids will not have permanent lodgement, and dust will not be easily produced.

(4) The durability and service rendered will be commensurate with the cost of construction and maintenance; that is, it must be economical.

(5) It must be easy of removal, replacement and repair and at reasonable cost, and with the appliances and materials within the control of the corporation.

In view of the above it will be apparent, I believe, that brick and asphalt are the two competing materials for use on Dundas street. With regard to the first quality, the

foothold afforded to horses, bricks must have the preference. It is one of the objectionable features of asphalt that it is exceedingly slippery when wet, and even when dry it is not always safe.

As to the second quality, asphalt must take first place since it is in a slight degree smoother and less noiseless than brick. It is doubtful, however, if traction is any easier, owing to the insecure footing afforded to horses.

There is little if any difference between the sanitary status of the two pavements. Both are, of course, impermeable and offer little resistance to the flow of liquids; the joints of the brick are just sufficient to retain moisture and subdue dust. With the smooth asphalt surface no amount of sprinkling will keep the surface moist in hot weather.

As to cost, asphalt is from one-half to one-third more than brick, and experience has not proven its life to be any greater. As to durability, there must always be the proviso, that good material and proper plans and methods of construction are used in any case.

The laying or repairing of brick does not require skilled labor as does asphalt, and this difficulty in connection with the latter is felt more particularly in places where only a short section of asphalt is used. In large cities the inconvenience is not so great.

While asphalt is extensively used in the United States and Canada, and is unquestionably a good paving material for certain streets of large cities, I believe brick more suited to the requirements of your town.

The quality of a brick pavement is not to be gauged by the best brick used in its construction, but by the poorest. For this reason it is necessary, before deciding on the kind to use, to see that it comes up to the standard of scientific tests. More than this, while the building of the pavement is in progress there should be careful inspection to see that no brick of an inferior quality is used.

There is a tendency also, to endeavor to reduce the cost of a pavement by having a cheap foundation Foundations of gravel, sand, and macadam have proven successful in a number of cases, but only where the natural sub-soil is of a loose and porous nature. In this climate, where we are subjected to alternatives of frost and slush, the experiment is a dangerous one. A foundation of four inches of concrete should be used. On this, place a one-inch cushion of sand and fill the joints of the brick with a cement of tar or pitch and sand. The earth sub-soil should, of course, have been previously graded, and consolidated with a heavy roller.

Tires.

To consider the cost of the construction of pavements is important, but the cost of their maintenance is not to be overlooked; and this latter will necessarily be very great so long as the use of narrow tires is permitted. The cost of maintenance falls on the same individuals as does the cost of construction, and as the users of vehicles are members of the community, it is hard to understand why they should wish to tax themselves for the additional cost of maintenance, and the additional cost of transportation caused by bad roads, the result of narrow tires. The use of narrow tires delays the era of good roads to a greater extent than does any other cause. The roads of European countries owe their perfection very largely to the tires which are sometimes as broad as ten inches, the tire of the ordinary market wagon being six inches in width. No town should be without a by-law regulating the width of tires, and no drays used for delivering heavy loads from the depots should have tires of less width than eight inches. Various towns in the province are now taking steps to regulate this matter.

Public Works.

Very rarely does the average citizen consider the meaning of a municipal corporation. It is merely a society organized to carry on certain institutions in a more serviceable and economical manner that would be possible for the individual member. The

character therefore of a town's public works are an index to the good judgment and taste of the citizens as a body. The handsome lawns and well kept private properties so numerous in Woodstock are indicative of the aspirations of the citizens toward rendering the town as perfect a place of residence as it can be made, and point to the conclusion that they are willing and prepared to bear their respective portions of the cost, as soon as they find that progress at a reasonable cost can be made. Every improvement made in a town helps to build up the town, and is in this respect a benefit to every ratepayer. While sewers and waterworks are necessary to a town's welfare on sanitary grounds, the proper construction and maintenance, at the same time beautifying the public thoroughfares, is a matter which you cannot in the future, as in the past, afford afford to overlook.

I was very much pleased with the active interest taken in the question by your council, and their evident desire to place this important part of municipal affairs on a business-like basis. The interest exhibited also at the public meetings of the citizens is an evidence that they have been considering the matter and are awake to the inefficiency of present methods.

TOWNSHIP REPORT.

To the Reeves and Councils of the Townships of East Nissouri, West Zorra and East Zorra :

GENTLEMEN : In accordance with your invitation, I visited your townships, drove over the roads, inspected their present condition, examined the material available for road construction, the system of expenditure, the methods and plans used in doing road work, the administration of the statute labor law, and beg to submit the following report and recommendations :

LABOR AND ROAD EXPENDITURE.

The roads of your townships are built and maintained under the statute labor system, supplemented by grants from the municipal funds. The statute labor system has some commendable features. Under it good work can be done, and has been done, at less cost to the taxpayer than could perhaps have been obtained otherwise. It is, however, peculiarly subject to neglect and evasion, and this has been taken advantage of to such an extent that the roads of your district have suffered in consequence. The manner in which road work is slighted is too well known to need description The wagons, horses and implements often brought out for use on the road, make up an assortment that would disgust any intelligent farmer, if he had to pay for them by the day at one-quarter rates for work on his farm. The work is too frequently done in a spiritless way, and a great part of the time is spent in talk. Some townships in various parts of the province commute the statute labor at such a reduced rate as to be practically an acknowledgement that statute labor has been shamefully neglected and thus brought into disrepute. The experience of one municipality is that, commuting at thirty-five cents per day, better results are obtained. That such could be the case is certainly a reflection on any municipality, and rather than commute at so low or even at a reduced rate, it is worth a struggle on the part of a township to make each day of statute labor worth one dollar in actual results on the roads.

Were the statute labor system economically administered, it would take only a short time to work a complete transformation in the condition of your roads. The true spirit in which statute labor should be performed was exhibited in the work of the pioneers, in road-making. In their day, population was sparse and the road allowance had to be cleared of forest. Stumps had to be grubbed, bogs burned, the roadway graded, swamps corduroyed, and streams bridged. Drainage was exceedingly difficult and there was no municipal fund from which to draw, for mending a culvert or filling in ruts. Labor was

then concentrated, and good, honest labor was given. Now, however, with the increase of population and wealth, roadwork is scattered in patch-work, and is done in a half-hearted way.

Statute labor is performed at a period of the year when the time of every farmer is of great value to him on his own farm. If the work of improving the roads is neglected, and a portion of the time spent in statute labor is wasted, it must be apparent to every citizen of the Province that there is a tremendous amount of energy lost to the country. We are obtaining our roads at an enormous expense, and if they are still to be bad roads, the expense is many times increased indirectly. Sufficient money is now being expended in your townships for material, if it were carefully prepared and skilfully applied.

Number of Pathmasters.

In order to bring the roads to proper condition, the operation of the statute labor system in your municipalities must be placed on a more systematic basis. One of the first steps would be to reduce the number of pathmasters. In each of your townships there are about 100 pathmasters, and, in consequence, as many different ideas of road building. The result, as shown on the ground, is that one pathmaster has considered sixteen feet a sufficient width of roadway, another eighteen, another twenty, and so on up to forty feet; one thinks a roadway should be flat; another that it should be rounded up a few inches; another, a few feet. Instances of these differences of opinion might be multiplied to almost any extent. Certainly all cannot be right, and this points to the fact that the control of the roads should be concentrated in fewer pathmasters under one central head. One man should have general oversight of the pathmasters and all work and expenditure on roads and bridges; and he should be required to report to the council at each meeting. He should have charge of all township machinery and materials. He should be a man specially adapted to the work, and his tenure of office should be as secure as that of the clerk or treasurer.

Besides being encumbered by the number of pathmasters, none of whom have sufficient means at their disposal to do permanent work, each pathmaster is surrounded by a few neighbors, and rather than incur disfavor by insisting on a fair day's work, frequently invites popularity by allowing or even encouraging neglect of the work. Were the beats enlarged, every pathmaster would become more independent and would have a sufficient number of days of labor under his control to undertake durable and complete work. But with their knowledge and experience in road-making, it cannot be in the interest of the townships for each pathmaster to be given the power to carry out his own ideas and experience on the road To believe that every man is a born road-maker is a great mistake, and in order to get over the evil it is necessary that every citizen should be willing to join hands with his neighbor, and to work under a man specially instructed. The work cannot be planned nor carried out to suit everybody. An army composed entirely of commanding officers, or a party of workmen made up of foremen, cannot make much headway.

Pathmasters.

Pathmasters should be chosen from among the most respected, intelligent men in the community, and they should be kept in office. Even then, their individual opinions and plans should be subject to revision by the council, which body should exercise a direct oversight of the roads, and their improvement by statute labor.

That there are men who could fill the office of pathmaster in a creditable manner, is apparent from the fact that, in driving over your roads, there were several sections which have been well done, and good pieces of road constructed by statute labor alone. That many are poor pathmasters is indicated by other sections which show no evidence of results except those produced by the expenditure of municipal taxes, contributed very largely by those who had worked with a will in performing their own statute labor on other beats.

When men of suitable ability, knowledge and experience have been once obtained, they should be retained in office. By the present system of annual rotation, as soon as the pathmaster has learned something in his year of apprenticeship, his experience is lost and another is appointed, who begins in his turn to take lessons in road-making at the expense of their condition. In other occupations an apprenticeship of some years is necessary before a person is qualified to practice, but a pathmaster, the moment he is chosen, is thought fit to direct a work requiring much science, at the expense of the township's capital of time, labor and money. Men are taken from the occupation in which they are skilled, and are transferred to one of which they know nothing. An honest man knows this, and immediately strives, from his personal experience, from the advice of others trained by practice and instruction, from experts, and from every available source, to properly qualify himself; with this and with continued experience he can become a most valuable officer. Such a man realizes the responsibility of his position and the duty he owes his fellow citizens whose property is placed in his charge, the expenditure of whose money he directs, and whose interests he is expected to advance. He commands the respect of those who have to serve under him, his order is obeyed, public interest is created and maintained, and the question of making good roads is rendered simple, requiring but a small outlay of money.

There is another man who strives for the office of pathmaster, and looks upon his appointment merely as a victory over a neighbor He exercises his authority in performing some act to aggravate a citizen with whom he does not see eye to eye. The improvement of the road is by no means the prime object; injury rather than betterment is the probable result, and those who are obliged to perform the work become disgusted.

Some men look upon their appointment as an acknowledgement by the council and community of their special skill as road-makers. The solicitation or acceptance of any advice from experienced men would be looked upon as a confession of unfitness, and certainly any suggestion to accept instruction from an expert would be regarded with contempt. The competent pathmaster, as well as the competent business man, is he who eagerly seeks, from every source, the fullest possible information pertaining to his special line, believing that his knowledge never can be too perfect.

Loyalty to Pathmasters.

It is one of the weaknesses of the statute labor system, that it is very difficult for a pathmaster to enforce prompt obedience to his orders. If a neighbor persists in idleness, or if, instead of doing as he is directed, he stops and argues for an hour on the wisdom of so doing, the pathmaster cannot obtain redress except at the expense of his neighbor's good-will, a step very few pathmasters are willing to take. A farmer could and would discharge an employee for pursuing such a course, but in the case of a pathmaster the roads must suffer. Under a proper administration of the statute labor law, it is apparent that it is the duty of every man, when performing statute labor, to set aside his personal feelings and opinions, and promptly do the work allotted him. This is the relation of the tax-payer to the pathmaster. On the other hand, the pathmaster (and going further back, the council), owes it to the tax-payer that all plans shall be carefully prepared and considered before the work is commenced, so that improvement will be made along the right line, and with the greatest economy of labor.

Gravel.

There appears to be a desire on the part of the people of your townships to put in their time by drawing gravel; and gravel is therefore hauled and dumped on the roads before the foundations has been prepared to receive it. I learned that, in West Zorra, $600 was paid this year for gravel (that is, just for the material), but most of the stuff placed on the roads is almost worthless, although first-class gravel is to be found in various pits in each township. Judging from the immense excavations, many thousands

of loads have been drawn, and farms have been paid for with the amount received for the gravel taken from one small corner. Contrasting the amount of material placed on the roads, with their condition as a whole, it is evident that there has been great waste.

Buying gravel by the load is like buying water by the bucket. Borings and test-pits should be sunk where gravel is known to exist, and the amount estimated from these borings. The material should be purchased in a business-like way for a fair amount; and in case of opposition from the owner, the land may be expropriated if necessary.

One source of the use of poor and dirty gravel arises from insufficient care in taking it from the pit. The social feature of statute labor is carried to the extent that those drawing gravel want to load up together, drive together to the place of dumping and return in company to the pit. There may be a dozen teams, and only room for one or two where good material is to be had in the pit. The remaining ten, however, drive in and fill up the wagon boxes with anything in sight, whether sand, clay or boulders, and this is the kind of "gravel" with which a good many roads are surfaced.

Not only should gravel be chosen from the best part of the pit, but care should be taken to sort out any bad stuff, sand, boulders, etc., that may be mixed with this. Gravel pits are covered usually with a deep layer of clay, loam or earthy material, useless on a road. While this is not shovelled directly into the wagons, it is undermined, falls down on the good gravel, and then goes along with it to the road.

Clay and Sand in Gravel.

Dirt mixed with gravel is not only useless, but is hurtful to the road. Evidence of this is found on your roads where a few loads of clean, hard gravel, have been placed on the road, followed by a load or two of dirty stuff, then clean metal, then dirty, and so on. The surface of such a road is a series of ups and downs, some smooth spots, then ruts.

It is contended that a certain amount of clay and sand is needed to act as a binder, and sections of roadway are pointed out which have consolidated readily, and make a nice smooth drive. This is undoubtedly the case during summer, but it will be found that a pleasant summer road is frequently a very poor fall and spring road. The bond made by sand and clay is weak, and there is not the mechanical hold which one stone takes upon another by pressure, as is the case when clean material is used and well rolled. The result is that an extended rain turns the road into slush, mud and ruts.

When clay or sand is mixed with gravel, it absorbs and retains moisture, the whole yielding readily under traffic. It has not the power to support wheels that good clean material has. In a number of townships throughout the Province, the practice of screening the gravel is successfully followed.

Stone Crushers.

Where such a large amount of money is spent annually for gravel, which, when laid on the road in its natural condition is largely useless, it appears to me that one of the first considerations of your council should be the purchase of a crusher whereby the gravel might be properly prepared, and nothing hauled but first-class material. By placing a crusher in the pit, all material could be passed through, and with a rotary screen attached, all sand, clay and fine stuff would be removed, leaving only the clean road metal. In some sections of your townships, field stone is plentiful, and gravel has to be hauled several miles. Where such is the case, the field stone might be crushed and placed on the roadway, making a more durable road at less cost than gravel. The work of crushing could be done at any suitable season of the year, in the pit or field, and the material left in piles ready to be placed on the road whenever needed.

Drainage.

The drainage of a road is quite as important as the gravelling, but the best way to obtain this must be one adapted to the nature and elevation of the soil, and the direction and extent of natural watercourses, etc. It is imperative, however, that provision shall be made wherever the soil is in a low or wet location, or is of a retentive nature, that it shall be drained both above the surface and below it. Sandy or gravelly soils very frequently do not need sub-drainage, while clay always requires it. Unless there is natural sub-drainage, artificial underdrainage must be resorted to.

Considerable has been done in making open drains by the roadsides in your townships, but a great many of these need deepening and cleaning to provide better sub-drainage. A much better practice than having deep open drains, is to use tile placed below frost line. These should, wherever practicable, be placed beneath the present open drains on each side of the road. No matter how good the material placed on the surface of the roadway, unless the natural soil beneath is kept dry the metal is forced down and the mud comes to the surface. When roads in this country are gravelled, they are frequently termed "Macadam." The important feature of the roads built by Macadam, however, was the drainage, not the surface covering.

Tile and open drains must be kept free, with a good fall to an unobstructed outlet. It is useless to drain water from the roadway and then keep it standing in drains until it soaks into and softens the natural soil under the gravel. At all seasons of the year, particularly spring and fall, when obstructions of snow and ice are likely to occur, the outlets should receive special attention.

Crowning the Road.

Too much crowning is as bad as too little ; but the road must be crowned or rounded to shed the water to side gutters. A great many of your gravelled roads are perfectly flat, and some are lower at the centre than at the side. To provide for wear and settling, the roads, when in a proper state of repair, have a rise of about one inch to the foot from the side to the centre. To crown the existing gravel roads which are too flat, the square shoulders at the side should be cut off. If these shoulders are composed of clean gravel, forced from the centre of the road by the wheels, the material may be drawn in towards the centre. As a rule, however, it is of such a quality as will turn to mud immediately the fall rains commence, and should be used in levelling the sides of the road, or in any other way that circumstances may make advisable. This stuff from the shoulders of the road has, in some instances, been brought indiscriminately to the crown of the road, with the result that a firm gravel foundation has received a coating of mud. During the summer it may have made a very pleasant surface, but in wet weather it becomes slushy, holds water and destroys the foundation beneath it. The shoulders having been disposed of, clean material from the pit should be placed in the centre. It will frequently be found that a sufficient depth of gravel is already on the road, requiring only the cutting off of the sides, and shaping up with a light coating of clean material properly applied. To do this work perfectly, quickly and economically, road graders should be used.

Applying Gravel to the Roadway.

The gravel placed on the roads of your townships has been merely dumped in the centre without any further treatment. The first effect of this is to drive vehicles to the side of the road. These side tracks are used until late in the fall when they have become cut up and flattened to such an extent as to destroy the shape of the road, preventing surface drainage. Water is held at the side, soaks into the roadway, and the gravel is forced down into the mud and is largely wasted.

Gravel should be nicely spread on the roadway and thoroughly rolled so that travel will at once use it. The objection is made to the use of clean gravel that it will not con-

solidate, a difficulty entirely removed by the use of a roller. If a roller is not used, the gravel should be raked into the wheel tracks and into the hollow worn by single horses, until the whole roadway is hard and smooth under traffic.

Width of Roadway.

The width of driveway on the majority of the roads in your townships has already been fixed by sharp, open ditches, and where the road has been coated with gravel, it will usually be found impracticable to alter it now. A gravelled strip, however, of eight feet in the centre is sufficient to accommodate the traffic on the greater number of your roads, and a greater width than twenty-four feet between ditches will generally be found needlessly expensive to maintain. If the roads of your townships were properly underdrained so that the open drains could be very shallow, a less width than twenty-four feet would generally be not only cheaper but better. A less width than eighteen feet is rarely advisable.

Road Graders.

Road graders are as necessary on the road as are self-binders in the harvest field, and if true economy is to be considered, are absolutely indispensable. When properly managed, a grader will do the work of from fifty to seventy-five men in shaping, crowning and scraping a road. One capable man should be employed to operate it whenever it is in use, as it requires considerable experience to handle it to the best advantage. The operator should know something about roads, and should be capable of following minutely instructions received from the Council. A grading machine of itself has no knowledge of road-making, and unless the operator has, satisfactory results cannot be obtained. By using such an implement for a few days on each statute labor beat, it is apparent that very much could be accomplished in shaping up the edges of existing gravel roads, and in grading dirt roads which have had but little attention.

Location of Roads.

As the sustaining power of a chain is no greater than the strength of its weakest link, so the utility of a road is measured largely by the steepest grade or poorest section. For this reason, hills, cuts and steep grades should be avoided, and the best ground for a road foundation should be chosen. Such pieces of road as are on hills should be judiciously altered to obtain easy grades, provision being made in the Municipal Act for such changes of location. A mistake sometimes arises from the idea that the distance over a hill is necessarily shorter than the distance round it; and that the distance down the valley and up, is shorter than the detour necessary to avoid it; whereas the reverse may be the case; and in any event, the steep grades, necessitating smaller loads, loss of time and expense for maintenance, form a very great consideration.

This is a very important matter which should be considered as far as possible at once. The longer the delay, the more difficult it will become to rectify errors. Numerous instances will be found throughout your townships in which a slight change in the course of a road would result not only in a great saving in building and maintaining it, but would add to the convenience of traffic.

Hills.

Hills need very careful treatment. Water is very commonly carried long distances by the side of the road, past natural water courses and through deep cuts in order to dispose of it over a hill. The secret of successful drainage is to dispose of water in small quantities, without allowing it to gain force and headway. Neglect of this principle is the cause of the bad condition of so many hills, making deep washouts and necessitating expensive repairs.

Hills are frequently springy, or are kept soft by water oozing from them. In such cases a line of common farm tile should be placed on each side of the roadway, underneath the gutter, and below frost. Wet points should always be tapped by blind drains leading diagonally across the roadway to side under-drains. The crown of the roadway on hills should be sharper than on level ground, otherwise water will follow the wheel tracks, deepening them to ruts, instead of being shed to the side gutters.

Bridges and Culverts.

The repairing and renewing of wooden bridges, sluiceways and culverts is a constant drain on the funds of a municipality. Timber is becoming expensive and iron is each year decreasing in price. It is encouraging to find your councils studying true economy in the construction of bridges by the use of stone and iron. The first cost of such permanent structures is much greater than that of wood, but with the greater term of duration and the fewer repairs needed, they will in the end be found less costly than wood, at the same time giving better service.

Cement culverts are used largely, particularly in East Nissouri, and will be found much more economical and more serviceable than wood. When properly constructed, with a free outlet, they are permanent, and in a few years your councils will be largely relieved of expenditure from this source.

Tires.

People tax themselves in time, labor and money for constructing roads, and then purchase narrow tired wagons to destroy them. If tires of from four to six inches were used on lumber wagons in your townships, a very great change would be quickly noticed in the condition of the roads. The difference between a narrow tire and a wide tire on a road, is about the same as the difference between a pick and a pounder. The one tears up, the other consolidates. When wide tires come into general use, a great part of the question of good roads will be solved, as the wear of the road is nearly as important an item to consider as its construction. With wide tires, the cost of keeping roads gravelled would be reduced one-half.

It is objected to broad tires that they are heavy to draw over a rutted or stoney road. It is, however, the narrow tires which are so largely responsible for the ruts and for working the stones loose; instead of which, wide tires would keep the roadbed smooth and would compress stones into it.

Maintenance of Roads.

The roads of your townships receive very little attention except at the time of performing statute labor. Roads are very much more cheaply and easily kept in good condition if repairs are made as soon as wear appears, for ruts and wheel tracks interfere with surface drainage, hold the water, and quickly cause the road to "break up" in wet weather. Repairs of this kind are of such a simple nature, requiring a little raking, filling a rut, the freeing of an obstructed drain, at the most a load of gravel, that every farmer could, with no loss of time, see that the half of the road allowance passing his farm was not neglected in such trifling matters. Attention of this kind would result in an immense benefit to every resident of the townships.

Instead, however, of men having sufficient public spirit to volunteer work of this description, we find them adopting all sorts of means to avoid doing even their just amount of statute labor. These men, after idling away their time, will wait in deputations on the councils, complaining of the bad and dangerous condition of their roads, asking for municipal grants to do the work which they should, in justice to other taxpayers, have done by their statute labor. No encouragement should be given in such cases by making money grants where the ratepayers neglect to make good use of their statute labor.

An excellent system has been adopted in some townships which has been productive of good results. Under a by-law of the municipality, where any section subscribes an amount of money for road improvement, the municipal council assists with an equal amount from the general funds. In other townships, no money is paid out for gravel unless the road division has first drained, graded and formed the roadway according to the set specifications of the municipal council.

If, however, a section of the people persist in looking on their statute labor as a joke, if the present waste and injustice continues, and the roads are permitted to remain in an unsatisfactory condition, a hindrance to individual and national progress; if, after a fair trial, it is found that the statute labor law cannot be operated in your townships on business principles, it will be the inevitable result that your ratepayers will demand its abolition and the substitution of a law that will be less easy to evade. This has been the result in numerous other townships, and if the old system is to exist still in your townships, its friends must make a radical change in the present methods of administration and prove its worth.

Toll Roads.

In a long settled and wealthy community such as Oxford, it is usual to find the main roads in fairly good condition. I was quite surprised to find, however, that this is rarely the case in your townships, and more so when I was informed that a number of these roads, especially near the business centres, are in the hands of chartered companies. The people have been taxed directly and heavily for these roads for nearly half a century. They were nevertheless in a deplorable state at the time of my visit.

The user of the toll-road is supposed to be taxed for travelling on a good road, not a bad one, and if there is any reason for these roads being in the hands of private corporations, it is that the public shall be benefitted. These roads on which heavy toll has been collected for so many years, in a populous and wealthy community, should be models for the construction of roads under municipal control. The only features which seemed to distinguish them from some of your concession roads were the toll gates at frequent intervals.

It may be urged by the owners of these toll roads, that a fair proportion of the earnings is being spent on them to place them in good condition, but if so, those in charge of this expenditure should also take lessons in road-making. The paying of toll is a system of taxation both antequated and annoying, and becomes especially so when the roads are badly maintained.

Good Roads.

There is a tendency on the part of some to look upon the good roads agitation as a stupendous enterprise, and to wonder how "they" can ever make all the roads of Ontario. In order to bring the roads of the entire Province to a good condition, no pathmaster and his men would have to go beyond their own beat.

In some divisions under incompetent pathmasters, men rake and scrape the mud, and idle away their time, expecting to receive grants from the council to do their work. When good roads are mentioned, they sit down on the bank of the ditch and ask what they will cost, and where the money will come from, wasting additional time in arguing against the movement. If those who built up the pioneer settlements, who chopped trees, grubbed the stumps, logged, burned and cleared the allowance, graded the roads, corduroyed the swamps, and bridged the streams by their united, zealous toil, without the aid of municipal grants, if these had sat down and estimated the cost, and cried for money, we would to-day have no roads, and your townships would still be a wilderness. Surely, with allowances cleared, the larger amount of grading done, material plentiful, increased population, knowledge and ability, and large amounts appropriated annually for road improvement, it cannot be a question of money.

A reorganization of the statute labor system bringing it to a business-like basis, gravel taken from the pit and applied more carefully, a better acquaintance with the principles of road-making, better drainage, proper implements, wider tires, a personal interest on the part of every citizen in keeping roads in a proper state of repair—these are the reforms necessary to improve your roads economically, durably and efficiently. These constitute the true objects of the good roads movement.

It would scarcely seem necessary to urge upon the residents of the rich and long settled townships of Oxford (a county which for many years has claimed the distinction of being a most progressive district, the garden of the Dominion), the benefits to be derived from, and the great need of better roads. While the county is a model one in many respects, in its handsome farm residences, its splendid barns, its reputation for high-grade stock, the roads nevertheless, are far from being such as I could recommend to other municipalities as models. That a community which thoroughly comprehends the advantages to be derived from modern improvements in agriculture, should be so far behind in matters pertaining to road improvement, is certainly to be regretted. But with a live interest now being taken by the citizens generally, in this branch of public improvement, I believe your councils will find the task of reform a comparatively easy one.

CEMENT-CONCRETE SIDEWALKS.

In connection with the improvement of streets, there is a widespread tendency to replace wooden sidewalks with others of more permanent material. In fixing grades, it will generally be necessary to undertake the construction of the entire street—roadway, sidewalks, boulevards—if the best results are to be attained, and for the purpose of economically and easily handling the excavated earth. Wooden sidewalks are lacking in durability, need constant attention to keep them in a safe condition, are not agreeable to walk on when a little worn, and will, in their ultimate cost, be found more costly than those of cement-concrete.

In constructing this latter class of walk, the space over which it is to be laid should be excavated to a depth of twelve inches below the top of the proposed walk, perishable or objectionable material being removed to a greater depth if necessary. The bottom of the excavation is then compacted by pounding or rolling until as firm as possible.

On the bed so prepared a layer of clean gravel or broken stone is spread to such a depth as will give, on thorough consolidation, a thickness of seven inches. Temporary curbs of pine should be set on each side of the excavation, to be removed after the walk has hardened.

On this foundation, and in the mold formed by the curbs, is placed four inches of concrete which should be composed of small broken stone, of a size not greater than one and a quarter inches in any direction, and entirely free from dirt or dust; clean screened gravel, sharp sand and Portland cement. This should be thoroughly rammed, and may be of the following proportions:

Cement	1 part
Broken stone	5 parts
Clean gravel	2½ parts

Slab or flag divisions are then marked off, from sixteen to twenty feet in length. This provides for settlement, expansion and contraction from frost, and lessens the tendency of the walk to crack irregularly from these causes. The joints should be filled with sand or other approved separating material.

Before the concrete has set, and while it is still adhesive, there should be laid on it a wearing surface one inch in thickness. This surface coating may be composed, if a sand finish is desired, of:

Portland cement	2 parts
Sharp sand	3 "

Over this should be sifted a layer of the best Portland cement, the whole to be then levelled, neatly trowelled, and rolled with a tooth roller to make a surface which will not be slippery. A more durable surface coating, known as granolithic, may be had by using broken granite in place of the sand. This broken stone should have a square or cubical fracture, be clean and fresh, and of sizes three-eighths of an inch downward. The composition will then be:

Portland cement	2 parts
Broken granite	3 "

The work should be kept moist, and protected from the direct rays of the sun, with canvas, until thoroughly set. Traffic should be kept off for a period of about fifteen days.

The various parts, cement, sand and broken stone, should be measured and mixed when dry, water then added as required, and the whole again thoroughly manipulated and mixed. There is a great necessity for careful and skilled workmanship, and an experienced man should have charge of the work.

If the sub-soil is of a nature to retain water, is low-lying and not sufficiently underdrained, a line of common field tile should first be placed below the centre of the walk. The surface of the finished walk should have a slope towards the gutter of one-quarter of an inch to each foot of width.

When built by a contractor, he should be required to guarantee that the walk shall last and remain in all respects in perfect order and condition, and free from all cracks and defects, and of perfect hardness consistency, smoothness and finish, for at least the term of five years from the date of its completion, unless subjected to other influence than the ordinary effects of wear and weather.

STATUTE LABOR LAW IN TOWNSHIPS.

The main provisions of the statute labor laws are the following;

(1) Every male inhabitant of the age of twenty-one years and upwards, and under sixty years, who is not otherwise assessed, and who is not in her Majesty's Military or Naval Service, on full pay or actual service, is liable to one day of statute labor on the roads and highways.

(2) Every person assessed upon the assessment roll of a township shall, if his property is assessed at not more than $300, be liable to two days statute labor; at more than $300, but not more than $500, three days; at more than $500, but not more than $700, four days; at more than $700, and not more than $900, five days; and for every $300 over $900, or any fractional part thereof over $150, one additional day.

(3) In townships where farm lots have been subdivided into park or village lots, and the owners are not resident, and have not required their names to be entered on the assessment roll, the statute labor shall be commuted, where such lots are under the value of $200, to a rate not exceeding one-half per centum on the valuation, but the council may direct a less rate to be imposed by a general by-law affecting such lots.

(4) A farmer's son rated and entered as such on the assessment roll is liable to perform statute labor as if he were not so assessed; but a tenant farmer's son, bona fide resident on the farm of his father or mother, is exempt from statute labor in the same manner as if he were the son of an owner and jointly assessed.

(5) A non-resident, wishing to perform his statute labor, must require his name to to be entered on the roll, otherwise a commutation tax is charged against his property according to the assessed value.

(6) Where a resident owner, tenant, or occupant, who has caused his name to be entered upon the assessment roll, after notice or demand, makes default in performing his statute labor or in payment of commutation for the same, the overseer of the highways in whose division he is placed shall return him as a defaulter to the clerk of the

municipality before the fifteenth day of August, and the clerk shall, in that case, enter the commutation for statute labor against his name in the collector's roll, and the same shall be collected by the collector.

(7) In every case the clerk shall notify the overseer of highways, that may be appointed for such division, in the following year, of the amount of such commutation, and the overseer shall expend the amount of such commutation upon the roads in the statute labor division where the property is situate, and shall give an order upon the treasurer of the municipality to the person performing the work.

By-Laws.

The council of every township may pass by-laws.

(1) For empowering any person, resident or non-resident, liable to statute labor within the municipality to compound for such labor, for any term not exceeding five years, at any sum not exceeding $1 for each day's labor ;

(2) For providing that a sum of money, not exceeding $1 for each day's labor, may or shall be paid in commutation of such statute labor ;

(3) For increasing or reducing the number of days labor, to which the persons rated on the assessment roll shall be liable, in proportion to the statute labor to which such persons are liable, in respect of the amounts at which they are assessed, or otherwise, respectively ;

(4) For enforcing the performance of statute labor, or payment of a commutation in money in lieu thereof, when not otherwise provided by law ;

(5) For regulating the manner and the divisions in which statute labor or commutation money shall be performed or expended ;

(6) For reducing the amount of statute labor to be performed by the ratepayers or others within the municipality, or for entirely abolishing such statute labor ;

(7) For reducing or varying the amount of statute labor to be performed by the ratepayers or others within certain defined areas in the municipality when, in the opinion of the council, exceptional circumstances exist, rendering such reduction or variation equitable, and upon such conditions as may be imposed by the by-law ;

(8) For providing for the making and keeping open of township roads during the season of sleighing in each year, and for appointing overseers of highways, or pathmasters to perform that duty, and such overseers and pathmasters shall have full power to call out persons liable to perform statute labor within their respective municipalities to assist in keeping open such roads, and may give to such persons as may be employed in so doing certificates of having performed statute labor to the amount of the day's work done, and such work shall be allowed for to such persons in their next season's statute labor.

(9) For providing for the application of so much of the commutation of the statute labor fund, as may be necessary for keeping open such roads as last aforesaid, within such respective municipalities.

(10) For providing that the pathmasters in their several road divisions, or other officers appointed for the purpose, shall enforce the provisions of by-laws respecting obstructions placed on the roads.

(11) For appointing overseers of highways, road surveyors, road commissioners, or other officers required by the corporation ; and for regulating the remuneration, and duties of such officers.

The foregoing provisions will be found in the Consolidated Assessment Act of 1892, sections 87 to 101 ; the Consolidated Municipal Act of 1892, sections 479 and 521 ; the Municipal Amendment Acts of 1894 and 1895.

BOULEVARDS.

The Municipal Amendment Act 1894 sec. 9, enacts that the councils of cities, towns and incorporated villages may pass by-laws :—

"For setting apart, upon such terms as to resumption by the municipality and otherwise as the by-law may state, portions of the public streets at or near the sides thereof for the purpose of boulevarding, and regulating the construction and maintenance of such boulevards, or for permitting the owners of property abutting on any street to construct at their own expense such boulevards, but so as not to unreasonably confine, impede or incommode public traffic, and for regulating and confirming boulevards already constructed on any street.

"For making regulations for the protection of all boulevards constructed in the public streets."

PROCURING MATERIAL FOR ROADS.

The council of any municipality may, in accordance with 55 Vic. chap. 42 sec. 550 pass a by-law as follows :—

"For searching for and taking such timber, gravel, stone or other material or materials (within the municipality) as may be necessary for keeping in repair any road or highway within the municipality ; and, for the purpose aforesaid, with the consent of the council of an adjoining municipality (by resolution expressed), for searching for and taking gravel within the limits of such adjoining municipality, and the right of entry upon such lands, as well as the price or damage to be paid to any person for such timber or materials, shall, if not agreed upon by the parties concerned, be settled by arbitration under the provisions of this Act ;

But no such gravel shall be taken or removed from the premises of any person in an adjoining municipality until the price or damage has been agreed upon between the parties, or settled by arbitration."

OPENING AND ALTERING ROADS.

County councils have power to pass by-laws under Sec. 566 S.S. 2 of the Consolidated Municipal Act as follows :—

For opening, making, preserving, improving, repairing widening, altering, diverting and stopping up roads, streets, squares, alleys, lanes, bridges or other public communications, running or being within one or more townships, or between two or more townships of the county ; or any bridge required to be built or made across any river over 100 feet in width within any incorporated village in the county connecting any public highway leading through the county, and which is in continuation of a country road, or between the county and any adjoining county or city or separated town, on the bounds of any town or incorporated village, within the boundries of the county, as the interests of the inhabitants of the county, in the opinion of the council, require to be so opened, made, preserved and improved ; and for entering upon, breaking upon, taking or using any land in any way necessary or convenient for the said purpose, subject to the restrictions herein contained.

AN ACT TO PREVENT THE SPREAD OF NOXIOUS WEEDS.

Chapter 202, Revised Statutes of Ontario, 1887 (Section 9).—It shall be the duty of the Overseer of Highways in any Municipality to see that the provisions of this Act relating to Noxious Weeds, are carried out within their respective Highway Divisions, by cutting down or destroying or causing to be cut down or destroyed at the proper times,

to prevent the ripening of their seed, all Noxious Weeds* as part of the ordinary statute labor, or to be paid for at a reasonable rate by the treasurer of the municipality, as the council of the municipality may direct.

Sec. 10, (Sub-Sec. 4)—Every overseer of highways who refuses to discharge the duties imposed upon him by this Act, shall, upon conviction, be liable to a fine of not less than $10 or more than $20.

ROADS AS LOCAL IMPROVEMENTS IN TOWNSHIPS.

Consolidated Municipal Act of 1892, Section 611a.—In case all the owners of the property or lots abutting according to the original survey by the Crown, on the road, street or public way hereinafter mentioned to be benefitted thereby, in any part of any township, petition the council for the macadamizing, gravelling, planking or otherwise improving by approved material, and draining any road, street or public way (describing it), or building a bridge in connection therewith, the council may procure an engineer or provincial land surveyor to make an examination of the said road, street or public way so proposed to be improved, and may procure plans and estimates to be made of the said work by such engineer or surveyor of the real property, municipalities and corporations to be benefited by such work, or the owners or occupants of which real property may or can use the same, stating as nearly as may be, in the opinion of such engineer or surveyor, the proportion of benefit to be derived therefrom by every road and lot or portion of lot, and of any railway or street railway, or municipality or corporation; and if the council is of the opinion that the proposed work or a portion thereof would be desirable, the council may pass by-laws:

1. For providing for the proposed work or a portion thereof being done, as the case may be.

2. For borrowing on the credit of the municipality the funds necessary for the work, although the same extends beyond the limits of the municipality (subject in that case to be reimbursed as hereinafter mentioned), and for issuing the debentures of the municipality to the requisite amount, including the costs of reference, if any, in sums of not less than $100 each, and payable within twenty years or less from date, with interest at the rate of not less than four per cent. per annum.

611*b*.—The several provisions of this Act, from section 569 to section 611*a*, both inclusive, and the amendments thereto not inconsistent with the last preceding section, and in aid thereof, shall, *mutatis mutandis*, be applicable, as far as possible, to the making and improvement of the said road, street or public way, and the drainage and other work connected therewith, in manner hereinbefore provided, as if the said several sections related to roads and the improvement thereof, so as to make the said clauses efficient for the construction of roads in substantially the same way as drains are now constructed.

COUNTY ROADS AND BRIDGES.

Consolidated Municipal Act of 1892, section 532.—The county council shall have exclusive jurisdiction over all roads and bridges lying within any township, town or village in the county, and which the council by by-law assumes with the assent of such township, town or village municipality as a county road or bridge, until the by-law has been repealed by the council, and over all bridges across streams or ponds or lakes separating two townships in the county, and over all bridges crossing streams or rivers over 100 feet in width, within the limits of any incorporated village in the county, and connecting any main highway leading through the county, and over all bridges over rivers or ponds or lakes forming or crossing boundary lines between two municipalities

* Noxious Weeds include Canada Thistles, Oxeye Daisy, Wild Oats, Ragweed and Burdock.

534.—When a county council assumes by by-law, any road or bridge within a township as a county road or bridge, the council shall, with as little delay as reasonably may be, and at the expense of the county, cause the road to be planked, gravelled or macadamized, or the bridge to be built in a good and substantial manner; and further, the county council shall cause to be built and maintained in like manner, all bridges on any river or stream over 100 feet in width, within the limits of any incorporated village in the county, necessary to connect any main public highway leading through the county.

SIDEWALK CONSTRUCTION IN TOWNS.

57 V. chap. 50, sec. 16.—It shall be lawful for the council of the corporation of any city or town which has not adopted the local improvement system in respect of sidewalks, by by-law to provide from the general funds of the municipality, or to raise by way of loan on the credit of the debentures of the municipality, forty per cent. of that part of the construction of granolithic, stone, asphalt, or brick sidewalks upon leading or principal business streets of such city or town as local improvements falling on the property benefited, in addition to the part of such cost to be provided by the municipality. and to add said forty per cent. to the said part of the cost of the construction of the said sidewalks to be provided by the municipality, and to issue debentures for the amount thus obtained, and it shall not be necessary to submit the by-laws of the said corporation authorizing the issuing of the said debentures to, or to have the assent of, the electors of the municipality before the final passing thereof, but any by-law for carrying the provisions of this section into effect, both as to selecting streets and providing the necessary funds, shall require an affirmative vote of three-fourths of the members of the council.

(1)—The remainder of that part of the cost of constructing the said sidewalks, falling on the property benefited, after the said forty per cent. has been deducted, shall be assessed for and dealt with in the manner provided as to assessments for local improvements in other cases.

REGULATIONS

Governing payments out of the Iron Mining Fund. Presented to the Legislative Assembly.

By Command

E. J. DAVIS,

Secretary.

Provincial Secretary's Office,
Toronto, 16 February, 1897.

COPY OF AN ORDER IN COUNCIL APPROVED BY HIS HONOR THE LIEUTENANT-GOVERNOR THE 25TH DAY OF APRIL, A.D. 1896.

"Upon the recommendation of the Honorable the Commissioner of Crown Lands, the Committee of Council advise that the annexed Regulations respecting the payment of a Bounty upon iron ores produced from Ontario Mines be approved of by Your Honor."

Certified,

J. LONSDALE CAPREOL.

Asst. Clerk Executive Council.

THE HONOURABLE

THE COMMISSIONER OF CROWN LANDS.

REGULATIONS TO GOVERN PAYMENTS OUT OF THE IRON MINING FUND, CAP. 16, S. 11, 12, 13 AND 14, 57 VIC., AND CAP. 13, S. 6, 59 VIC.

1. The Commissioner of Crown Lands may appoint a competent person to analyze for their metallic contents all iron ores upon which bounties may be claimed for payment out of the Iron Mining Fund, as provided by sections 11, 12, 13 and 14, chap. 16 of 57 Victoria, and section 6, chap. 13 of 59 Victoria, and such person shall select for this purpose fair average samples from the ore piles at the mines or from the cars or stockhouse after delivery at a blast furnace in the Province, and shall report thereon for the lots of each miner or producer of ore separately to the Director of the Bureau of Mines, and payments out of the Fund may be made by the Treasurer of the Province pro rata according to such analyses, based on the total quantity of ore smelted in the furnace and of the pig or metallic iron product thereof.

2. The miner or producer of ore who proposes to make a claim upon the Fund shall notify the Director of the Bureau of Mines of his intention so to do at least one week before shipment of ore is made to a blast furnace in the Province and subsequently when such shipment has been made, in order that samples thereof may be procured, and in filing his claim for payment out of the Fund, which he shall do on or before the first day of December in each year, with a statutory declaration of the correctness thereof, he shall accompany the same with a certified statement (also verified by a statutory declaration of the correctness thereof) from the manager or superintendent of the blast furnace showing the quantity of ore in tons and pounds furnished by such miner or producer which has been smelted during the twelve months ending 31st day of October next preceding, and showing also the percentage of metallic iron per ton produced from such ore when practicable.

3. In case ores the product of mines situate outside of the Province of Ontario are used with those of Ontario mines, the manager or superintendent of any blast furnace using such ores shall notify the Director of the Bureau of Mines in order that samples may be taken of the various kinds and grades of such other ores for analyses, and shall on or before the first day of December in each year furnish a statement (verified by statutory declaration) of the total

quantities of ores smelted in the furnace during the twelve months ending 31st day of October next preceding, distinguishing those of each of the Ontario mines from all others, and also of the pig or metallic iron product of all such ores, and payments out of the Fund upon such ores the product of Ontario mines may be made by the Treasurer of the Province to the parties entitled thereto as provided in the first Regulation hereof.

4. Or if the owner of a blast furnace has regularly in his employ an analyst whose duty it is to make analyses of all ores smelted in the furnace, the Commissioner of Crown Lands may at his option agree with the miner or producer of Ontario ores to accept such analyses as the data for estimating the pig or metallic iron product of all ores smelted at the furnace, whereon to compute payments out of the Fund to miners or producers of ore as provided in the first Regulation hereof; but the Commissioner may reserve the right to take samples of all ores for the making of check analyses, if deemed expedient so to do.

5. Every miner or producer shipping ores to a blast furnace and claiming aid out of the Iron Mining Fund, together with every person, firm or company purchasing such ores to whom claims upon the Fund by the party earning the same may be assigned, and the managers or superintendents of blast furnaces in the Province at which such ores are delivered and smelted, shall, if the Commissioner of Crown Lands so require, furnish to the satisfaction of the Director of the Bureau of Mines, on or before the first day of December in each year, statements under statutory declaration of the quantities of ore so shipped, and so received and smelted respectively, during the twelve months ending 31st day of October next preceding, and shall produce their books and records for examination by any person appointed by the Commissioner of Crown Lands for the purpose of verifying the statements so made to the Director of the Bureau of Mines,—in the case of such miners and producers or dealers as to quantities mined or purchased and shipped to a blast furnace, and in the case of managers and superintendents as to (1) quantities from such miners, producers and dealers received and smelted, (2) quantities of ores from all other sources smelted, and (3) the net metallic iron product of all ores so smelted during the year: and the Commissioner of Crown Lands may require such statements to be furnished and such examinations to be made monthly, quarterly or semi-annually, as may seem necessary or convenient for the due administration of the Fund: and all payments out of the Fund may be made by the Treasurer of the Province upon the certificate of the Director of the Bureau of Mines approved by the Commissioner of Crown Lands. Notwithstanding anything herein contained, the said Commissioner may call for such other and further proof or verification of any statement, account or allegation, or in respect of any matter or thing, as to him shall seem meet and proper.

6. The fees for analyses of iron ores payable to the person appointed by the Commissioner of Crown Lands for such purpose shall be made out of the Iron Mining Fund, and shall be a first charge thereon. Payments out of the Fund to miners or producers of ores, or to any person, firm or company purchasing such ores to whom the claims upon the Fund by the party earning the same have been assigned, may be made by the Treasurer of the Province at the end of each calendar year, or as soon before or thereafter as the necessary statements and data have been supplied to the Director of the Bureau of Mines for enabling him to certify to the said Treasurer, and the maximum rate and amount thereof shall be as limited by section 13, chap. 16 of 57 Victoria.

Correspondence on matters referred to in the foregoing Regulations should be addressed to the Director of the Bureau of Mines, Parliament Buildings, Toronto.

ANNUAL REPORTS

OF THE

LIVE STOCK ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO

1896-7.

DOMINION CATTLE BREEDERS' ASSOCIATION.
DOMINION SHEEP BREEDERS' ASSOCIATION.
DOMINION SWINE BREEDERS' ASSOCIATION.
DOMINION SHORTHORN BREEDERS' ASSOCIATION.
DOMINION AYRSHIRE BREEDERS' ASSOCIATION.
HEREFORD BREEDERS' ASSOCIATION.
HACKNEY HORSE SOCIETY.
CLYDESDALE HORSE ASSOCIATION.
SHIRE HORSE ASSOCIATION.
CANADIAN HORSE BREEDERS' ASSOCIATION.

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ANNUAL REPORT

OF THE

LIVE STOCK BREEDERS' ASSOCIATIONS.

1896-97.

To the Honorable the Minister of Agriculture:

I have the honor to submit herewith the Annual Report of the Dominion Cattle, Sheep and Swine Breeders' Associations.

Your obedient servant,

F. W. HODSON,
Secretary.

LIVE STOCK BREEDERS' ASSOCIATIONS.

ANNUAL REPORT OF THE SECRETARY-TREASURER.

As secretary-treasurer of Cattle, Sheep and Swine Breeders' Aassociations I have decided to prepare a joint report this year. This is allowable, because the annual report of each body is yearly published in one volume. From correspondence and intercourse I learn that the general public have a wrong idea concerning the aims and work of our associations. To put this matter right I will quote a few clauses which form the basis of the constitution of each of the associations.

THE OBJECT OF THIS ASSOCIATION SHALL BE:

"To encourage a general and constant improvement in the breeding and management of cattle, sheep and swine, by the dissemination of reliable and practical information on the subject; by co-operating with the officers of the various fair associations in encouraging large, attractive and instructive displays of cattle, sheep and swine; by holding or assisting in holding a winter exhibition of cattle, sheep and swine; by encouraging the keeping of records of pure-bred animals.

"To improve the judging of live stock by presenting to the secretaries of the larger fair associations, and others who may apply for them, carefully prepared lists, giving the names and addresses of parties who are deemed competent to act as judges of the various breeds of cattle, sheep and swine.

"To instruct and interest the farmers of Canada in animal husbandry, and to forward the interest of the owners of live stock in every honorable way."

Everyone familiar with the history of these associations knows that these laudable aims have been carried out, and each of the associations has accomplished a good work, and that the scope of their influence and usefulness has increased each year.

A short history of the work accomplished will interest many readers and benefit the associations by making their work better known.

THE DOMINION SHEEP BREEDERS' ASSOCIATION

is the oldest of our joint associations. The following quotation is taken from the first annual report published in 1889: "In 1876, a number of gentlemen met in Toronto for the purpose of founding this association. Among those present were: J. C. Snell, Edmonton; James Russell, Richmond Hill; Arthur Johnston, Greenwood; John Miller, Brougham; Wm. M. Miller, Claremont; Wm. Hodson, Brooklin; John R. Craig, F. W. Hodson, and several others. An association was formed, but through an unfortunate circumstance, never again convened, most of the movers in the matter uniting with American associations. In September, 1888, a meeting of sheep breeders was called by the authorities of the Ontario Agricultural College, to discuss the advisability of founding Canadian sheep records. This was opposed by some of the leading breeders. Several gentlemen were appointed a committee to bring the matter up again, but in reality it was dropped, and we are safe in saying that it would not again have been heard of, had not the present secretary interested himself in the matter. With and by the aid of Messrs. Russell, Campbell, Jackson, Snell, Dryden, Miller and Hallam, this association, as separate and distinct from all others, was brought into existence, and all expenses connected with its formation were entirely borne by one man, but without the aid of the above mentioned gentlemen he could not have established it. Let it be fully understood

that this is a Sheep Breeders' Association, formed for their mutual benefit and protection, and not a record association. It was founded to benefit the sheep interests of the Dominion, and not for the benefit of any one breed. Two meetings were held during 1889—one at the Albion Hotel, Toronto, March 13th, and the other at the City Hall, London, September 12th. Both meetings were very well attended."

The First Annual Report

contained thirty-two pages, and was issued in 1889. In it are published papers by R. Miller, Hon. John Dryden, Rock Bailey, John Campbell, John Hallam, J. C. Snell, W. A. Hale, C. N. Sweetapple, V.S., J. S. Pearce and others. The report issued in 1890 contained sixty pages, and included the Second Annual Report of the Sheep Breeders' Association, and the First Annual Report of the Swine Breeders' Association ; thereafter these two associations issued a joint annual report. Though bound in one volume, it has each year been divided into two parts, one of which is devoted solely to the Sheep Breeder's Association, and one to the Swine Breeders' Association. The reports of 1891 contained eighty pages ; 1892, 120 pages ; 1893, 168 pages; 1894, 120, and 1895, which also included the first annual report of the Dominion Cattle Breeders' Association, and the annual reports of several kindred bodies, contained 168 pages. These annual reports have for some years been recognized as among the best publications issued by the Ontario Department of Agriculture, containing as they do papers and addresses by the most successful and experienced live stock breeders in Canada and the United States. The ripe experience of a life time is, in many cases, given to the public in a single paper, and the discussion thereon, which is also reported, brings out additional facts of the greatest possible value. It is safe to say that much valuable and practical information that could have been disseminated in no other way, has been given to the public in these reports. The best methods of breeding, feeding, selling and shipping, as well as methods and experiments which have proved unsuccessful, have been brought out in strong lights. This serves both as an example and as a warning. The teachings contained in the annual reports alone have added materially to the wealth of this Province, and will continue to do so, for many years to come.

Until the Sheep Breeders' Association was organized in 1889, the live stock breeders were disunited in every sense of the word, and as a class were without influence, and therefore at the mercy of each of the corporations with which they had to do. In addition to this, individual breeders were frequently found working at cross purposes, to the injury of the entire fraternity. Even in

The Appointment of Judges

to make awards at the chief exhibitions of the Province, the interests of the rank and file of the live stock men were lost sight of. This state of affairs became a crying evil, and was one of the first defects the associations set about to improve. The first step taken was the selection of a number of men capable of judging each breed of sheep, swine, and cattle. A separate list was prepared for each breed, and a copy of each of these lists was sent to the secretary of each large fair association in Ontario, and two representatives from each association, whose legitimate expenses were paid by the body represented, were sent to look after our interests at the board meetings of each of these exhibitions Well do I remember the first time I presented a list of sheep and swine judges to the directors at a meeting of the Agriculture and Arts Association. The chairman took the list, and after examining it for a few minutes, indignantly exclaimed, "There is not a man from my division named in these lists ; we will have nothing to do with them." There were no recognized judges of sheep or swine in his division at that time, but the interests of the exhibitors were forgotten and the spirit of patronage was dominant. If this condition prevailed among the directors of this ancient and honorable society, whose members were supposed to be farmers, what could we expect from the managers of other exhibition associations ? Thanks to the work done by the

officers of the Dominion Cattle, Sheep and Swine Breeders' Associations, this state of affairs has passed away. Our nominees are welcomed by the officers of each of the chief exhibition associations, and in this respect, as in many others, the influences of our associations is gradually increasing, as the following letter received to-day attests :

MONTREAL EXPOSITION COMPANY,
MONTREAL, March 11th, 1897.

F. W. Hodson, Esq., Secretary Dominion Cattle, Sheep and Swine Breeders' Associations, Guelph, Ont.

DEAR SIR,—Some time ago I received a notification from you, giving the names of the delegates from your association to our Exposition Company. I notified both of these gentlemen that I had heard from you, and asked them to favor us with any suggestions they might think desirable, and told them I would notify them of meetings of the Swine Committee I will be pleased to receive your last annual report, and also to have a list of names of such gentlemen as your association would recommend as competent judges in the swine department. We are very desirous of doing the fullest possible justice to exhibitors in the matter of judges, but I have often thought that if the judges for a few of the leading exhibitions could be selected and paid by your association we might possibly obtain more satisfactory results than we have hitherto had.

Yours very truly,

(Signed,) S. C. STEVENSON,
Manager and Secretary.

The exhibition associations of Toronto, London and Ottawa receive our delegates even more cordially than does the Montreal Association. The result of our efforts to improve the judging of stock at the larger exhibitions has been most gratifying, yet we feel that much remains to be done.

TRANSPORTATION OF PURE-BRED ANIMALS BY FREIGHT IN ONTARIO.

The Transportation Committee of the Dominion Cattle, Sheep and Swine Breeders' Associations met the representatives of the various Canadian railways, and obtained the following reduction in shipping weights of pure bred animals. The weights at which pure-bred animals will hereafter be carried by the Canadian railways are as follows. The charge per cwt. remains as heretofore :

	Pounds each.
Bull calves, 6 months old and under	500
Bulls and bull calves, over 6 months and under one year old	1,000
Bulls, one year and up to two years	2,000
Bulls, over two years' old	2,600
Cows, one animal	2,000
Cows, two animals in same car	3,500
Cows, three animals in same car	5,000
Each additional animal in same car	1,000
(Must be from one shipper to one consignee, in one shipment, to one destination.)	
Heifer calves, 6 months old and under	500
Heifer calves, over six months and up to one year old	1,000
Heifers, over one year and up to two years old	1,500
Heifers, over two years old, same as cows.	

Certificates of registration must, in all cases, be produced by shipper. Agents will take note of particulars as to name of animal and age, and keep record of same. Also make note of billing accordingly.

Pedigreed stock as above, may be taken without men in charge, provided owners sign the usual contract releasing the company from liability in consequence thereof.

The above special estimated weights will only apply when owners sign the usual valuation agreement for ordinary stock. If extra values are declared the weights and rates will be as per classification for valuable stock, page 42, classification No. 10.

FREIGHT RATES ON PURE-BRED CATTLE, SHEEP AND SWINE FROM ANY POINT IN ONTARIO TO ANY POINT IN MANITOBA AND THE CANADIAN NORTH-WEST.

The Joint Transportation Committee has also arranged with the officials of the Canadian Pacific Railway and the Grand Trunk Railway to carry pure-bred cattle, sheep and swine, in car loads, from any point in Ontario and Quebec west of Montreal, at the rate charged on settlers' effects. The charge for a car load of pure-bred stock from any point in Ontario to any point in Manitoba and westward may be learned from any agent of the C. P. R. or the G. T. R., and is published in the pamphlet known as "F. T. No. 45, Canadian Pacific Railway Special Through West-bound Tariff on Settlers' Effects." The rate for a carload of 20,000 pounds from any point in Ontario or Quebec, west of Montreal, to Winnipeg, is $72 per car load; to Regina, $90; to Calgary, $114; and corresponding rates to all other western points. (The rates hitherto in force for a similar car load have been—to Winnipeg, $130; to Regina, $164; to Calgary, $202; and these latter rates are now charged for animals not recorded.)

Under the new arrangements it is not necessary to load all the animals composing a car load at any one point, *i.e.*, part of a car may be loaded at London, part at Woodstock, part at Toronto, or at any other station on the direct line between the starting point and the destination of the car. No additional charges will be made for a car so loaded except shunting charges, which are $3 for the first stop, and $2 for each subsequent stop.

One man will be passed free with each car load, and he will be returned from the destination of the car to the original point of shipment at one cent per mile, second class. All animals sent at the above rates must be pure-bred, and shipped for breeding purposes only; and a certificate of registration for each animal must be presented to the agent at the shipping point. After being examined by the agent, each certificate will be returned to the shipper.

Parties who wish to ship single animals from any point in Ontario to Manitoba and the west, may do so at carload rates by corresponding with the Secretary of the Associations, and as soon as enough animals to fill a car are offered, the car will be forwarded in charge of a suitable attendant. The price charged for the transportation of such animals will be about $10 per head for cattle over two years' old when sent to Winnipeg. If sent to Regina, the charges will be about $12 per head; and to Calgary, $15. Young cattle, sheep and swine will be carried at proportionate rates. (From three to four sheep, and from two to six pigs usually occupy as much space as one bullock.) The above charges include feed and attendance. In addition each shipper will be required to pay shunting charges necessitated by his shipment. Freight in all cases must be prepaid.

In regard to unloading and the final distribution of pure-bred stock shipped from Ontario to points in the Northwest, the following arrangements have been made with the C. P. R. The car containing stock shall be way-billed through to the farthest point of destination, and may be stopped off at intermediate points on the direct line to unload animals, $2 will be charged for each time the car is stopped. That is, a car may leave Toronto containing animals bought by persons residing in or near Winnipeg, Portage la Prairie, Brandon, Regina, Prince Albert and Calgary. This car may be billed through to Calgary, and the car stopped at Winnipeg and animals unloaded. It may again stop at Portage la Prairie and animals again dropped off, so also at Brandon and Regina. The animals intended for Prince Albert would require to be trans-shipped at local freight rates from Regina to Prince Albert; the car would then proceed to Calgary; $2 will be charged for each of these stops, excepting the one at Calgary, which is the destination of the car. All animals transhipped from a central point over branch lines will be charged local freight rates.

REDUCED RATES FOR SHIPMENT OF THOROUGHBRED CATTLE, SHEEP AND SWINE.

The following circular dealing with local freight rates has been issued by the Canadian Pacific railway lines west of Lake Superior, the Manitoba and North Western Railway, and the Great North-Western Central Railway :

In order to encourage the introduction and exchange of thoroughbred cattle, sheep and swine, in the agricultural districts in Manitoba, Assiniboia, Alberta, Saskatchewan and British Columbia, shipments will be accepted for carriage, in less than carload lots, at a reduction of fifty per cent. from published tariff rates between stations on all lines west of Lake Superior.

To entitle shipments of aged (full grown) cattle, sheep and swine to this concession in rate, the owner or agent must produce to the shipping agent a properly attested descriptive certificate that the animal is pure-bred, and admitted to full registry in a book of record established for that breed.

☞ Unregistered young stock will be accepted for shipment at the same discount when accompanied by the breeder's statutory declaration, descriptive of the animal and its pure breeding, showing that it is eligible for registration, and that written application for a certificate has been made to the secretary of the book of record for that breed.

Agents are expected to examine the stock offered for shipment under the terms of this circular, and to see that the animals agree with the descriptive pedigree or statutory declaration provided by the shipper.

Way-bills for aged stock (full grown) must give a description of the animals, the number of the certificate, name of herd book, etc.

Way-bills for unregistered young stock must give a description of the animal and bear notation that breeder's declaration was produced and is on file with the agent's copy of live stock contract.

The owner or agent will be carried in charge on the same terms and conditions as prevail in the handling of ordinary stock.

A. McDonald,
A.G.F.A., M. & N. W. Ry.
Winnipeg, Man.

H. F. Forrest,
R. and M., G.N.W.C.Ry.,
Brandon, Man.

Robt. Kerr,
Traffic Manager, C.P.Ry.,
Winnipeg, Man.

RATES CHARGED ON ANIMALS SHIPPED FROM ONTARIO TO EXHIBITIONS IN MANITOBA AND THE WEST.

The C. P. R. will carry animals from Ontario to the Northwest for exhibition purposes at the reduced rate per carload, and will return the same at one-half the going rate. For instance, a shipment to Winnipeg would be charged $72. If returned to the original point of shipment the rate would be $36 in addition to the $72, total $108, from any point in Ontario west of Montreal to Winnipeg. Corresponding rates to other points.

An attendant will be carried free with each carload.

Further particulars may be had by applying to the general or local freight agents of the C. P. R. or the G. T. R., or F. W. Hodson, Parliament Buildings, Toronto, Ontario. In case any shipper fails to obtain any of the above freight rates such a one is respectfully requested to immediately write or telegraph full particulars to Mr. Hodson.

Quarantine Regulations.

Ever since Great Britain scheduled Canadian cattle, our officers and members have been most active in their efforts to bring influence to bear that would cause the British Government to reconsider their decision; we regret to say we failed in this particular. Canada has been most unjustly treated by the Mother Land in this respect. As a matter of protection England had a perfect right to exclude our cattle, but when she did this on the false plea that our herds were infected with pleuro-pneumonia, the conduct of her statesmen was simply outrageous. As soon as it was found that Britain would not reconsider her decision, the officers of our Association decided to send a deputation to Ottawa to induce, if possible, the Canadian authorities to open negotiations with the Government at Washington, looking toward the modification of the quarantine regulations which at that time existed between Canada and the United States, and which were practically prohibitive, especially in the case of cattle. For more than two years this agitation was

kept up. The first appeal to the Government at Ottawa was made by a strong deputation, and Mr. Foster, in behalf of the late Government, promised to take the matter in hand. Soon after this the Conservative administration was defeated, and we found it necessary to appeal again to Ottawa. On the 8th of September, 1896, a mass meeting was held on the grounds of the Toronto Industrial Exhibition, at which the Hon. Sidney Fisher, Minister of Agriculture for the Dominion, and the Hon. John Dryden, Minister of Agriculture for the Province of Ontario, were present, and there met the largest and most representative gathering of live stock breeders that has ever convened in Canada. Addresses were delivered by the Hon. John Dryden, Messrs. Hobson, Johnston, Russell and others. The Hon. Mr. Fisher replied, promising to consider carefully this most important question. Your officers continued to keep this question before the people, and we were gratified when, in December, 1896, the Hon. Mr. Fisher and the Hon. John Dryden left for Washington to confer with the American Government regarding the quarantine regulations. The Hon. Mr. Fisher has favored me with the following history of the case and the outcome of the negotiations.

Removal of the Cattle Quarantine Between the United States and Canada.

Seventeen years ago alarming reports appeared in the American press that rinderpest was epizootic in the neighborhood of Washington, and other points on the Atlantic seaboard. Dr. Duncan McEachran, Chief Dominion Stock Inspector, was commissioned by the Canadian Government, at the instigation of the British Government, to visit the infected districts and make a report as to the nature of the disease. He did so, and found that the disease was not rinderpest as reported, but contagious pleuro-pneumonia.

At this time a bill was introduced into the British Parliament by the Duke of Richmond, its object being to lessen the danger of the importation of diseased animals into Great Britain from other countries. This bill provided that all countries in which animal disease of a contagious nature existed should be put on the scheduled list; which meant that the animals would not be allowed pratique into any portion of the British Isles, but would be slaughtered at the port at which they landed, within ten days of their landing there. Countries in which no disease existed were to be allowed, as formerly, to land their cattle, which could be taken into the interior markets in Great Britain.

Dr. McEachran had no difficulty in discovering that the disease was widespread in the District of Columbia, on the seaboard of Pennsylvania, in the State of New York, particularly around Brooklyn, and in New Jersey. The report the doctor then made led to the United States being placed on the scheduled list.

A thorough search was made through Canada and no contagious disease of cattle could be found. A report to this effect was made to the British Government, with the result that Canadian live stock were allowed free entry to any port in the British Isles.

The consequence of this was that the American Government were induced to adopt measures for ridding the country of this cattle disease, and subsequently led to the establishment of the Bureau of Animal Industries, with Dr. D. E. Salmon as Chief. For a time the Bureau found difficulty in administering the necessary regulations, on account of State rights; these led to an Act of Congress giving them power to deal with these diseases throughout the entire country, and they continued to deal with them actively.

Nearly three years ago, a report was made by the then Commissioner of Agriculture, Mr. Lohring, that the last case of pleuro-pneumonia had been exterminated, and a request was made to the British Government to remove the schedule. It was not considered at the time advisable to do so, nor has it since been done.

On several occasions, on behalf of the Canadian Government, Dr. McEachran made special investigations personally in the previously infected districts of the United States, and failed to find any trace of contagious pleuro-pneumonia. In addition to this, investigations were conducted by veterinaries throughout different parts of the United States at the doctor's request, and the result of their reports was that no cases of pleuro-pneumonia could be found.

Dr. McEachran attended meetings annually of the members of the veterinary profession of the United States and Canada, notably one during the World's Fair at Chicago, in 1893, where a paper was read on the subject of pleuro-pneumonia by the late John Gadstone, M.R , C.V.S., of Philadelphia, at which the subject of pleuro-pneumonia was thoroughly discussed. A resolution was passed unanimously at that meeting, which was published in the report of the U. S. Veterinary Medical Association for that year ; that it was the unanimous opinion of the veterinary profession of the United States and Canada, there assembled, that contagious pleuro-pneumonia no longer existed in the United States, and that it never had exis ed in the Dominion of Canada, except in the quarantine at Quebec, in 1886, whence it had never been allowed to spread. Numerous inquiries have been instituted by Dr. McEachran, and through the profession in the United States, and he had no hesitation in reporting to the Government of Canada that the United States have been free from contagious pleuro-pneumonia for over two years.

Previous to the establishment of the quarantine between the two countries, there existed a large trade in live stock, more especially in cattle for breeding purposes, and cattle for feeding, usually called "stockers," or "store cattle." The quarantine of ninety days, which was established to satisfy the British Government that the pleuro-pneumonia of the U. S. would not be admitted to Canada, led to a cessation of this large and valuable exportation of animals from Canada to the United States. Up to this time also large numbers of live stock were exported from Canadian ports, especially by the St. Lawrence route from Chicago and other western points ; this valuable trade was also cut off by the quarantine.

For a number of years urgent recommendations have been made by the cattle shippers, by the Boards of Trade, by the breeders of thoroughbred stock and others, to the Canadian Government, to have these quarantine restrictions removed as being no longer necessary, since the disease for which quarantine was established had been extirpated from the United States, to the satisfaction of the veterinary advisers of the Canadian Government.

Owing to the bill introduced by Mr. Long, British Minister of Agriculture, making the embargo on Canadian cattle permanent by legislative enactment, on the supposition that pleuro-pneumonia existed in Canada, notwithstanding that no such disease actually did exist, or anything to support even a suspicion that pleuro-pneumonia had ever existed in Canada, except as above stated in the Quebec quarantine ; being, therefore, satisfied that there was no hope of the embargo on Canadian cattle being removed by the British Government ; and meeting the urgent demands of those interested in breeding, in exporting and in carrying Canadian live stock, the present Government have been induced to take steps to remove, or modify, the quarantine regulations existing between Canada and the United States.

On the 14th December, 1896, the Hon. Sidney Fisher, Minister of Agriculture, accompanied by his private secretary and Dr. Duncan McEachran, Chief Inspector of Stock for Canada, visited Washington, and interviewed the American Secretary of Agriculture, the Hon. J. Sterling Morton, and Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, and it resulted in an agreement being entered into between the Canadian Minister and the United States Secretary of Agriculture, the substance of which has already been published. The quarantine of ninety days has been done away with ; but no precautions have been overlooked to prevent the possibility of the introduction of any contagious disease from the one country to the other.

The system of inspection of testing for tuberculosis, of certificates of freedom of districts and animals from disease, is so thorough, that the substitution of the present regulations, while removing unnecessary hindrances to the freedom of trade between the two countries in live stock, and restoring the American market for surplus Canadian animals, both thoroughbred and grade, in no way increases the risk of the introduction of any contagious disease, should such exist in either country.

It is provided in the International agreement, that cattle from European countries should be dealt with as heretofore, viz.: subjected to a quarantine of ninety days. This is absolutely necessary, for the reason that contagious pleuro-pneumonia has been discov-

ered, both in Scotland and in the neighborhood of London, England, whence most of the animals imported into Canada come, within the last six months. Contagious diseases are known to exist in other European countries. Consequently, it would be unwise to lessen preventive measures instituted for the prevention of these contagious diseases by the establishment of quarantine at the seaboards.

The following are the American regulations governing the export of Canadian stock into the United States, which are about the same in every particular as the Canadian regulations for the importation of U. S. stock :

WASHINGTON, D.C., January 23, 1897.

"All animals imported into the United States from Canada must be accompanied by an affidavit made by the owner or importer, declaring clearly the purpose for which said animals are imported, viz., whether for breeding purposes, for milk production, for work animals, for grazing, feeding, or slaughter, or whether they form part of settlers' effects, or whether they are horses entered for temporary stay, as provided in section 7 of these regulations. Said affidavit must be presented to the Collector of Customs at the port of entry, who will decide whether the animals are entitled to entry under these regulations, and who will notify the Inspector of the Bureau of Animal Industry in all cases where these regulations require an inspection to be made.

"All animals imported into the United States for breeding purposes, for milk production, for grazing or feeding, horses for work, and swine for slaughter, must be inspected by an Inspector of the Bureau of Animal Industry at the port of entry. All animals covered by this section except horses and swine for slaughter must be accompanied by a certificate signed by a Canadian official veterinarian, stating that no contagious disease except tuberculosis and actinomycosis in cattle, affecting the species of animals imported, has existed in the district in which the animals have been kept for six months preceding the date of importation, except animals which are part of settlers' effects, or belonging to Indian tribes, which may be entered without certification or inspection. The owner or importer must present an affidavit that said certificate refers to the animal or animals imported. The certificate for cattle for breeding and for milch cows must also show that they have been submitted to the tuberculin test and found free from tuberculosis, giving the date of testing, with the chart of reaction, and a description of the cattle, with age and markings. All animals imported for breeding purposes, milk production, grazing or feeding, when not accompanied by the required affidavits and certificates, must be detained in quarantine for one week, at the expense of the owner or importer, under the supervision of the Inspector in charge. During the detention a rigid inspection will be made, and cattle for breeding or milk production will be tested with tuberculin. Animals found free from disease at the end of this period will be released. Cattle and sheep for grazing or feeding, if accompanied by the required affidavits and certificates, need not be unloaded for inspection, but all other animals covered by this section must be unloaded and carefully inspected.

"All Canadian animals will be admitted at any port in the United States for transit in bond to any Canadian port without inspection.

"Cattle and sheep in bond for export will be admitted without inspection at any of the ports named in section 1, in transit to and for export from Portland, Me., Boston, Mass., and New York, N.Y. Horses will be admitted in bond at any port of the United States without inspection for export from any port of the United States. All animals admitted for export will be subject to inspection at port of export.

"Horses for temporary stay, whether for pleasure driving, teaming, exhibition, racing, or used in connection with stock raising or mining, cattle and sheep for slaughter, and animals belonging to Indian tribes or forming part of settlers' effects, will be admitted through any port without inspection or certification.

7. "The railroad cars used in the transportation of animals specified by these regulations must be thoroughly cleaned and disinfected before said animals are placed therein. All litter from previous shipments must be removed, and the car whitewashed with lime and carbolic acid, one pound of commercial carbolic acid to five gallons of lime wash. Unless this regulation is complied with Canadian animals will not be allowed entry into the United States, and animals from the United States will not be admitted into Canada. Shippers should see that cars are properly cleaned and disinfected before animals are loaded."

The practical results of the changed conditions are most gratifying The trade in pure-bred stock between the two countries has revived and will doubtless continue to grow and be of mutual advantage. Since the change in the regulations the trade in light stockers between Canada and Buffalo has been gratifying to Canadians In the issue of March 3rd, 1897, that excellent paper, *The Breeders' Gazette*, of Chicago, Ill, among other things, says: "One month has now elapsed since the removal of the quarantine on live stock between Canada and the United States. Up to Monday night last, March 1st, Ontario farmers and feeders had disposed of some 325 car loads of cattle at the Buffalo yards (the first since the quarantine restrictions of 1889, the removal of which went into effect February 1st, 1897), and we understand that bull buyers are visiting Canadian herds contracting stock for shipment to our northern ranges. If any butchers' stock or any breeding stock has been bought by Canadians on this side of the line the *Gazette* has yet to hear of it. It may be said, therefore, that the events of the past four weeks demonstrate clearly that under the 20 per cent. *ad valorem* duty of the

Wilson-Gorman tariff law the United States market are easily entered by Canadian feeders' and butchers' stock, and that in the absence of quarantine restrictions, breeding stock—which under all our tariff laws have been on the free list—will be in demand again from this side of the line. It is equally clear that no live stock will be bought from us by Canada. In other words, as between the producers of live stock on both sides of the line this is reciprocity of the genuine jug-handled brand. There is a good market here for Canadian live stock. There is practically no market for American live stock in Canada. Hence we have one of those instances presented which formed the basis of the doctrine enunciated by Mr. Blaine—that we should use the tariff to 'trade on,' exacting some concession in favor of some American product in exchange for any arrangement of our own customs duties that permits the profitable entry into our markets of any given product of a foreign nation. If the new Congress proposes to legislate along this line it will, therefore, either put a higher duty on Canadian cattle (other than breeding stock), or let it remain where it is, and allow the cattle to continue to enter in return for some amendment to the Dominion tariff that will let American goods of like value into Canadian markets. 'A fair exchange is no robbery.'" The article from which this extract is taken occupies nearly two columns and a half, and should be carefully read by every Canadian farmer and politician.

For many years all animals registered in Canadian Records were allowed to be exported to the United States duty free, but in 1889 all Canadian records were discredited by the American Government, and in order to pass duty free into the United States, pure-bred animals bred in Canada must be recorded in American Records. Canadian Records have as high a standard and are in every way as carefully conducted as the American herd, stud and flock books, therefore the officers of your association have exerted themselves to induce our American neighbors to recognize Canadian Records. Negotiations are now pending.

The exhibits and attendance at the Ontario Provincial Fat Stock and Dairy Show, which is annually held under the auspices of these associations, have increased in number each year. A separate report has been prepared, dealing with this department of our work.

The Swine Records.

Before our Associations were established, there were no swine records published in Canada. The members of the Swine Breeders' Association at once interested themselves in this matter, and in 1892 the first volume of the Dominion Swine Breeders' Record was issued. Since then six volumes have been published, containing the pedigrees of 8,149 Berkshires, 4,483 Yorkshires, 468 Suffolks, 1,495 Chester Whites, 1,892 Poland Chinas, 979 Tamworths, and 291 Duroc Jerseys. The seventh volume is now in the printer's hands.

FINANCIAL STATEMENTS.

The forms subjoined give a complete financial statement of each Association up to December, 1886:

CATTLE.

RECEIPTS.

	1892	1893	1894	1895-6
Members' Fees	.....	.....	.....	$ 84 00
Legislative Grant	.....	.....	.....	1,500 00
Receipts from Public Meetings, etc	.....	.....	.....	58 13

EXPENDITURE.

Balance due Treasurer	.....	$ 10 00	$ 10 00	.....
Officers' Salaries for 1895 and 1896	.....	.....	.....	200 00
Directors' Fees and Expenses	.....	.....	.....	162 20
Postage and Stationery	.....	.....	.....	22 00
Printing	.....	.....	.....	87 84
Office Supplies	.....	.....	.....	17 70
Miscellaneous	.....	.....	.....	6 55

SHEEP.

RECEIPTS.

	1889-90	1891	1892	1893	1894	1895	1896
Balance on Hand	.....	$ 253 30	$ 324 32	.....	.....	.....	$ 197 02
Members' Fees	$ 53 00	94 00	61 00	$ 68 00	$ 78 00	$ 96 00	61 00
Legislative Grant	250 00	300 00	300 00	700 00	850 00	850 00	1,500 00
Entry Fees, Fat Stock Show	.....	.....	.....	.....	.....	114 00	.....
Receipts from Meetings	.....	.....	.....	.....	131 00	.....	58 13
Miscellaneous	.....	30 00	.....	.....	50	.....	.....

EXPENDITURE.

Balance due Treasurer	.....	.....	.....	48 18	123 40	54 99	.....
Conventions and Meetings	.....	60 70	73 00	.....	68 40	87 32	37 88
Officers' Salaries	.....	50 00	50 00	.....	*200 00	100 00	100 00
Postage and Stationery	21 95	34 68	87 50	32 19	42 43	58 70	12 50
Printing	7 00	152 90	.....	73 30	85 06	96 87	33 99
Lecturers' Expenses	.....	40 00	.....	.....	.....	.....	.....
Reporter	.....	10 00	20 00	10 00	.....	41 25	12 00
Prizes at Fat Stock Show	.....	.....	435 00	480 00	500 00	414 00	1,147 00
Directors' Expenses	4 75	.....	9 50	83 23	79 90	.....	87 19
Papers, Articles, etc	5 00	.....	.....	153 00	.....	.....	.....
Office Supplies	.....	.....	.....	.....	.....	.....	18 70
Miscellaneous	11 00	4 70	58 50	16 50	10 30	9 85	19 65

*For 1893 and 1894.

SWINE.

RECEIPTS.

	1890-91	1892	1893	1894	1895	1896
Cash on Hand	.....	$ 288 11	$ 117 26	$ 266 35	$ 301 41	$ 375 80
Members' Fees	$ 40 00	339 00	424 00	590 00	488 00	480 00
Legislative Grant	300 00	300 00	700 00	700 00	700 00	1,200 00
Public Meetings, etc	.....	.....	.....	97 00	.....	58 13
Received from Prosecution	.....	.....	.....	109 00	.....	.....
Entry Fees, Winter Show	.....	.....	.....	.....	95 00	.....
Unpaid Prizes	.....	.....	.....	.....	72 89	.....
Record Fees	.....	.....	.....	.....	.....	638 75
Miscellaneous	.....	33 35	.....	.....	.....	.....

EXPENDITURE.

Directors' Expenses	5 25	24 85	93 32	131 62	.....	116 48
Postage and Stationery	14 49	.....	.....	58 05	75 54	30 29
Printing and Advertising	12 40	49 65	68 93	90 44	106 26	62 04
Lecturers' Expenses	10 00	.....	.....	.....	.....	.....
Reporting	5 00	20 00	10 00	.....	41 00	12 50
Prizes at Fat Stock Show	.....	236 00	381 58	500 00	453 00	986 26
Expenses for Meetings	.....	45 00	.....	27 90	105 43	43 43
Officers' Salaries	.....	*100 00	.....	†200 00	100 00	100 00
Record Supplied Members	.....	248 20	307 58	444 58	391 05	.....
Papers, etc	.....	.....	105 00	.....	.....	.....
Office Supplies	.....	.....	.....	.....	.....	18 70
Miscelleneous	4 75	109 50	8 50	8 35	9 14	17 97

*For 1891 and 1892.
†For 1883 and 1894.

Questions Now Under Consideration.

During 1897 we hope to consider further the transportation of live stock. A vigorous Transportation Committee should be appointed by each association. Now that we enjoy reduced transportation rates on pure-bred stock shipped between Ontario and Manitoba and Western Canada, we should do our utmost to extend trade in this direction. The privilege is a very important one, and has already proved a benefit to Ontario sellers and western buyers.

It has been the practice of each association to publish in the annual report each year the name and address of each member and specify the breed he reared. This has grown to be the largest Breeders' Directory in Canada. During the last three years I have

been very frequently asked for these lists by parties desiring to buy pure-bred stock, and have mailed hundreds of copies, sending them to various parts of Canada and the United States. I believe that if these lists of breeders could be revised and distributed monthly it would be of great value. In order to do this each member of the association would be required to notify me on or before certain dates each month, to be fixed by the association, what animals he or she has for sale. The list could be revised and copies of the circular mailed. I have now about 4,000 addresses of live stock breeders and of prominent farmers in Canada and the United States. This plan would cost the association about $15 per month, but would increase the membership of the Cattle and Sheep Breeder's Associations, and it would have a tendency to increase the sales made by our members not only in Ontario, but in the distant Provinces and in the United States. Besides benefitting the members it would supply the Departments of Agriculture of the various Provinces and States, and the Secretaries of Farmers' Institutes and agricultural associations, farmers and American buyers, with just such information as they desire.

The Annual Report

of each association is a very important feature and must be kept up to a high standard. Two years ago the Sheep and Swine Breeders' Association decided by a unanimous vote to have a standard of excellence of each breed of sheep and swine bred in Canada prepared and published. As yet little has been done in this respect. I would therefore suggest that each association instruct the executive committee to proceed with the work at once. For fuller particulars regarding this subject see the annual report for 1893, page 153. A complete standard of excellence for cattle, sheep and swine would furnish suitable matter for our next Annual Report, and could be obtained more cheaply and more conveniently than any other suitable matter. This question has been before the Sheep and Swine Breeders' Associations for four years, and at the request of these Associations I have got together a good deal of suitable material which will be of value to the committees engaged in the work.

Shall these Associations continue to hold a Provincial Winter Show?

Shall each Association elect a consulting Veterinary Surgeon?

Shall each Association elect a legal adviser?

F. W. Hodson, Secretary-Treasurer.

SECOND ANNUAL REPORT

OF THE

CATTLE BREEDERS' ASSOCIATION,

1896-7.

OFFICERS FOR 1897.

President ..... JOHN I. HOBSON, Guelph.
Vice-President ..... J. C. SNELL, Snelgrove.
Secretary-Treasurer ..... F. W. HODSON, Guelph.
Vice-Presidents (representing the different Provinces):

Ontario ..... HENRY WADE, Toronto.
Manitoba ..... JOHN E. SMITH, Brandon, Man.
North-West Territories and British Columbia ..... G. H. GREIG, Winnipeg, Man.
Quebec ..... H. D. SMITH, Compton, Que.
Nova Scotia ..... LT.-COL. W. M. BLAIR, Nappan, N.S.
New Brunswick ..... JULIUS INCHES, Fredericton, N.B.
Prince Edward Island ..... F. G. BOVYER, Georgetown, P.E.I.

Auditors ..... D. MCCRAE, Guelph, and JAMES RUSSELL, Richmond Hill.

Directors:

Shorthorns ..... A. JOHNSTON, Greenwood.
Herefords ..... ALF. STONE, Guelph.
Polled Angus ..... JAMES BOWMAN, Guelph.
Galloways ..... D. MCCRAE, Guelph.
Ayrshires ..... JAMES MCCORMICK, Rockton.
Holsteins ..... G. W. CLEMONS, St. George.
Jerseys ..... Capt. WM. ROLPH, Markham.
Guernseys ..... Hon. WM. MULOCK, Ottawa.
Devons and Sussex ..... W. C. EDWARDS, M.P., Rockland.
Ontario Agricultural College ..... G. E. DAY, B.S.A., Guelph.

Representatives to Fair Boards:

Toronto Industrial ..... A. JOHNSTON, Greenwood, and G. E. DAY, O.A.C., Guelph.
Ottawa ..... JOS. YUILL, Carleton Place, and J. D. CLARK, Ottawa.
London ..... RICHARD GIBSON, Delaware, and Capt. T. E. ROBSON, Ilderton.

COMMITTEES.

Executive, Programme and Transportation. The President, Vice-President, Secretary, and Messrs. A. Johnston and David McCrae.

Delegates to the Board of the Provincial Winter Fair. John I. Hobson, J. C. Snell and G. W. Clemons.

LIST OF MEMBERS OF CATTLE BREEDERS' ASSOCIATION

FOR 1896 AND 1897.

NAME.	ADDRESS.	CLASS.
Anderson, J. A. R	Hamilton, Ont.	Ayrshires,
Bowman, Jas.	Guelph, Ont	Polled Angus.
Bull, B. H. & Son	Brampton, Ont.	Jerseys.
Ballantyne, W. W.	Stratford, Ont.	Ayrshires.
Blyth, R.	Marden, Ont.	Shorthorns.
Bolton, F. & W	Armstrong Mills, Ont.	Shorthorns.
Brown, D.	Iona, Ont.	Shorthorns.
Biggins, W. J.	Clinton, Ont.	Shorthorns.
Bovyer, F. G.	Georgetown, P.E.I.	Shorthorns.
Barclay, Luther	Port Hope, Ont.	Shorthorns.
Birrell, David	Greenwood, Ont.	Shorthorns.
Butler, Wm. & Sons	Dereham Centre, Ont.	Guernseys.
Burnett, Leonard G.	Greenbank, Ont.	Shorthorns.
Ballantyne, Thos. & Son	Stratford, Ont	Ayrshires.
Brown, A. & D.	Iona, Ont.	Shorthorns.
Cowan, Wm.	Guelph, Ont.	Shorthorns.
Chinnick, Jas. & Ed.	Box 425, Chatham, Ont.	Shorthorns.
Clemons, G. W.	St. George, Ont.	Holstein-Friesian.
Corby, H.	Belleville, Ont.	
Cooper, J. V.	Picton, Ont.	Shorthorns.
Caldwell Bros.	Orchard, Ont.	Ayrshires.
Douglas, Jas.	Caledonia, Ont.	Shorthorns.
Davidson, Jas. I.	Balsam, Ont.	Shorthorns.
Davis, H. J.	Woodstock, Ont.	Shorthorns.
Dyment, Naaman.	Clappison, Ont.	Ayrshires.
Dredge, Wm. & Son	Nassagawaya, Ont.	Shorthorns.
Else, Leonard	Boxall, Ont.	Jerseys.
Elliott, W. R.	Hespeler, Ont.	Shorthorns.
Edwards, W. C.	Rockland, Ont.	Jerseys, Shorthorns and Ayrshires.
Flath, Lewis.	Drayton, Ont.	Jerseys.
Fairburn, H. K.	Thedford, Ont.	Shorthorns.
Farmers' Advocate	London, Ont.	
Fried, John.	Roseville, Ont.	Shorthorns.
Gibson, R.	Delaware, Ont.	Jerseys and Shorthorns.
Gaunt, E. & Sons.	St. Helen's, Ont.	Shorthorns.
Gardhouse, Jas. & Sons.	Highfield, Ont.	Shorthorns.
Gibson, J. T	Denfield, Ont.	Shorthorns.
Grainger, Wm. & Son.	Londesboro, Ont.	Shorthorns.
Guy, Thos., Estate of.	Oshawa, Ont.	Ayrshires.
Holland, Isaac.	Culloden, Ont.	Ayrshires and Guernseys.
Hunter, Jos	Alma, Ont.	Shorthorns.
Hood, G. B.	Guelph, Ont.	Grades.
Herdt, Chas.	Frome, Ont.	Jerseys.
Hobson, John I.	Guelph, Ont.	Shorthorns.
Hoover, A	Emery, Ont.	Holstein-Friesians.
Hamilton, Wm.	Guelph, Ont.	
Hallman, A. C.	New Dundee, Ont.	Holstein-Friesians.
Harper, Samuel.	Cobourg, Ont.	Devons.
Isaac, John.	Markham, Ont.	Shorthorns.
Inches, Julius.	Fredericton, N.B.	
Johnston, A.	Greenwood, Ont.	Shorthorns.
Jamieson, R.	Perth, Ont.	Ayrshires and Jerseys.
Jeffs, E. & Son	Bond Head, Ont.	Shorthorns.
Jameson, Wm. L.	Dutton, Ont.	Polled Aberdeen Angus.
Leask, Jas.	Greenbank, Ont.	Shorthorns.
Linton, Wm.	Aurora, Ont.	Shorthorns.

MEMBERS OF THE CATTLE BREEDERS' ASSOCIATION.—*Concluded.*

Name.	Address.	Class.
Martyn, J. W	Canton, Ont	Shorthorns.
Martindale, F	York, Ont	Shorthorns.
Miller, John	Markham, Ont	Shorthorns.
Mutrie, John, M.P.P	Oustic, Ont	Shorthorns.
Miller, R	Brougham, Ont	Shorthorns.
Marshall, R	Snelgrove, Ont	Holsteins.
Morton, David & Sons	Hamilton, Ont	Ayrshires.
Murison, Jas	West Lorne, Ont	Polled Aberdeen Angus.
McCrae, David	Guelph, Ont	Galloways.
McCorkindale, John	Guelph, Ont	Shorthorns.
McQuillan, A	Guelph, Ont	Shorthorns.
McCallum, John	Iona Station, Ont	Shorthorns.
McDougall, Hugh	Guelph, Ont	Polled Angus.
McGregor, J. D	Brandon, Man	Polled Angus.
McNish, C. H	Lyn, Ont	Guernseys.
Nicols, W. H	Hamilton, Ont	Dealer.
Oke, Jas	Alvinston, Ont	Shorthorns.
O'Brien, John	London West, Ont	Jerseys.
Peterson, C. W	Calgary, Alta	Ayrshires and Highland Cattle.
Russell, Jas	Richmond Hill, Ont	Shorthorns.
Rudd, W. G	Eden Mills, Ont	Devons.
Rolph, Wm	Markham, Ont	Jerseys.
Rivers, Wm	Walkerton, Ont	Shorthorns.
Russell, Thos	Exeter, Ont	Shorthorns.
Rice, A. & G	Curries, Ont	Holstein-Friesian.
Rusnell, D. H	Stouffville, Ont	Shorthorns.
Ramsay, A. G	Hamilton, Ont	Jerseys.
Ransford, R. & J	Clinton, Ont	Grades.
Robinson, R. J	Ailsa Craig, Ont	Shorthorns.
Rutherford, Wm	Roseville, Ont	Shorthorns.
Rawlings, A	Forest, Ont	Herefords.
Robertson, Thos	Dunsford, Ont	Polled Angus.
Snell, J. C	Snelgrove, Ont	Jerseys.
Stewart & Son	Lucasville, Ont	Polled Angus.
Smith, Amos	Trowbridge, Ont	Shorthorns.
Sibbald, F. C	Sutton West, Ont	Shorthorns.
Silcox, Edgar	Shedden, Ont	Jerseys.
Stewart, Wm., jr	Menie, Ont	Ayrshires.
Sorby, D. & O	Guelph, Ont	Ayrshires.
Smith, W. M. & J. C	Fairfield Plains, Ont	Ayrshires and Jerseys.
Smith, Jas. S	Maple Lodge, Ont	Shorthorns.
Shaw, Robt	Woodburn, Ont	Shorthorns.
Scott, F. W	Highgate, Ont	Shorthorns.
Sharp, Jas	Rockside, Ont	Polled Angus.
Stone, Alfred	Guelph, Ont	Herefords.
Smith, W. M	Hay, Ont	Shorthorns.
Shaw, A. J. C	Thamesville, Ont	Durhams.
Stutt, Richard	Forest, Ont	Herefords.
Smith, Amos	Trowbridge, Ont	Shorthorns.
Thompson, E	Guelph, Ont	Durhams.
Tolton, Jas	Walkerton, Ont	Shorthorns.
Thompson, Wm. T	Uxbridge, Ont	
Talbot, R	Everton, Ont	Shorthorns.
White, R. E	Perth, Ont	Ayrshires and Shorthorns.
Watt, J. & W	Salem, Ont	Shorthorns.
Wright, Herbert	Guelph, Ont	Shorthorns.
Whitelaw, Andrew	Guelph, Ont	Shorthorns.
Wade, Henry	Toronto, Ont	
Wood, W. J	Cornwall, Ont	Jerseys.
Yule, Jas	Elder's Mills, Ont	Galloways.

DOMINION CATTLE BREEDERS' ASSOCIATION.

ANNUAL MEETING

The annual meeting of the Dominion Cattle Breeders' Association was held in the City Hall, Guelph, December 7th, 1896, the President, Mr. John I. Hobson, in the chair. At the close of the President's address the Secretary addressed the meeting, setting forth the advisability of a through-car service for the distribution of pure-bred live stock, this service to finally include a through-car on the trunk lines of the G. T. R. and C. P. R., but he urged the desirability of taking immediate steps whereby a through-car service could be established between Toronto and Winnipeg. This project was freely discussed by the members present, and was heartily endorsed by many of the leading breeders, although the President and Mr. James Russell, of Richmond Hill, objected to the scheme.

It was moved by DAVID MCCRAE, seconded by ALEXANDER SMITH, and carried unanimously, "That this matter be dealt with by the following committee, this committee also to meet the Tariff Commission appointed by the Dominion Government, and to act as a Transportation Committee: Messrs. John I. Hobson, J. C. Snell, Arthur Johnston, David McCrae, F. W. Hodson."

A number of questions *re* the transportation of live stock were read by Mr. David McCrae. Suggestions were offered by the meeting and the matter left in the hands of the Transportation Committee.

The following resolution was adopted, "That this Association memorialize the Minister of Agriculture of the Dominion respectfully requesting him that when appointing an agriculturist for the Dominion, he appoint not only a practical farmer but also a man who is in close touch with the breeders of live stock, and one well acquainted with their needs, and that a copy of this resolution be forwarded to the Honourable the Minister of Agriculture

It was moved by J. C. SNELL, seconded by ARTHUR JOHNSTON, and carried unanimously, "That believing that contagious pleuro-pneumonia and other dreaded diseases are not at present existing in the United States or Canada, this Association is of the opinion that as long as these countries are free from contagious diseases, cattle of all kinds should be admitted to either country without quarantine, but after careful and efficient veterinary inspection, under such regulations as may be mutually agreed upon between the two countries."

It was unanimously resolved, "That the Government of the Dominion be respectfully requested to urge on the Secretary of Agriculture at Washington, the justice of doing away with the present rule of the Customs department, which refuses to acknowledge pedigrees recorded in Canadian Herd Books, the standard governing such records being equal to, and in some cases higher than corresponding American records."

The Secretary was instructed to obtain from the officers of the various Cattle Breeders' Associations in this Province, a list of expert judges for the different breeds, and where no association for any breed, to request the director for that breed to prepare and forward a list of expert judges for that breed. Said lists to be published in the annual report of this Association.

The meeting, which was the most largely attended and most successful ever held by the Association, then adjourned to meet at the call of the Secretary.

MEETING OF THE DIRECTORS OF THE DOMINION CATTLE BREEDERS' ASSOCIATION.

A meeting of the directors of the Dominion Cattle Breeders' Association was held in the Palmer House, Toronto, on March 23rd, 1897, Mr. John I. Hobson, the President, in the chair.

The following officers and directors were present: John I. Hobson, Mosboro'; David McCrae, Guelph; Arthur Johnston, Greenwood; G. E. Day, Guelph; Capt. Wm. Rolph, Markham; J. C. Snell, Snelgrove; G. W. Clemons, St. George; Robert Miller, Brougham; H. Wade, Toronto; W. E. Butler, Dereham Centre; Alfred Stone, Guelph, and F. W. Hodson, Toronto.

Mr. Hobson briefly addressed the meeting as follows: I intend to be brief, and my chief reason for this is that our Secretary has gone very fully into the questions which have been dealt with during the past year, viz., quarantine, transportation, matter of the records, etc. There has been at no previous time a meeting of live stock associations which is so important as this one. We have been working for years to be recognized, and we have at last arrived at that point when the interests which we represent are fully recognized. The deputation which went to Montreal were listened to in a manner, and our business attended to in a way, that it had never been listened to or attended to before. We went to Ottawa and the Premier took the matter in hand, as he recognized that we represented the great stock interest of this country. For what has been accomplished I refer you to the report of the Secretary, also to what you yourselves know has been done. There are, however, a few matters which are not touched on in the report of the Secretary. First, I think it is desirable that an official auditor should be appointed to audit the books of our Association instead of picking up a man here and there. I do not consider this a proper way of doing. I think it better that we should have an official auditor, one whose report would be recognized as the report of a man who understood his business. Second, the question of holding a Fat Stock Show is a matter of large interest, and the prize list of this important show should be revised. Third, the question of the Secretary's salary; the Secretary of this Association in the earlier days had very little to do compared with the work there is now, and I think there is a feeling that the time has come when he should not do the work for a great deal less than what might be considered a proper and reasonable remuneration. know Mr. Hodson has had to give up a great deal of work he had formerly been doing, and work for which he received considerable remuneration.

The minutes of the last meeting were then read and adopted.

Mr. George Sandfield Macdonald, of Montreal, who has for some time past been making a close study of rates for transportation of live stock, was present by invitation, and, at the President's request, gave a short talk on Canadian freight rates. He said that during the last six years the freight tariff on milk, on lines entering Montreal and Toronto, had been increased 200 per cent. In the United States the tendency had been towards lower freight rates. Here the tendency had been upward. The tariff on live stock was especially objectionable. There was no reason why there should be a maximum weight placed on live stock for purposes of shipment any more than on anything else. In Texas the State Railway Commission had compelled railways to charge for carrying animals by actual weight. In that State, too, the rates were regulated by law—30 cents for the first twenty-one miles on less than car lots, and one cent for each additional two miles. Mr. Macdonald further said that the United States Interstate Commerce Commission prevented United States railways from charging beyond 40 to 100 per cent. more per cwt. for less than car lots than was charged per cwt. for car lots. Here the discrimination against the small shipper ran from 150 to 200 per cent. The matter was left in the hands of the Transportation Committee to confer with Mr. Macdonald.

REPORT OF THE TARIFF COMMITTEE.

The PRESIDENT: I think I am the only one of the Committee at the meeting to-day. We had a joint meeting of the various committees appointed by the different live stock associations, and we decided upon a single line of policy, which it was thought desirable to ask the Government to carry out. I was appointed to appear before the Commission as the representative of the Dominion Cattle Breeders' Association, Mr. Alex. Smith from the Dominion Sheep Breeders' Association, and Messrs. Richard Gibson and J. E Brethour from the Dominion Swine Breeders' Association. We brought the various matters before the Commission, spoke at considerable length and had a courteous hearing. They were, however, very non-committal in their replies. The following are the requests we made:

1. Urge the removal of duty on corn.
2. The reduction of the duty on coal oil.
3. A reduction of the duty on agricultural implements and tools.
4. The duty on wind-mills to be as low as that on agricultural implements.
5. Duty to be removed on binder twine.
6. A reduction of the duty on articles made from wool; all specific duties to be removed.
7. All duties on agricultural seeds to be removed.
8. The reduction of the duty on wire fencing and other wire.

REPORT OF THE TRANSPORTATION COMMITTEE.

The report of the Transportation Committee was given by the President and Mr. ARTHUR JOHNSTON. The report is fully embodied in the annual report of the Secretary.

The reports of the Tariff and Transportation Committees were accepted.

LIVE STOCK COMMISSIONER

It was moved by G. E. DAY, seconded by J. C. SNELL, that a special committee consisting of D. McCrae and the Secretary be appointed to communicate with other live stock societies and breeders of the Dominion to urge upon the Government the appointment of a live stock commissioner for the Dominion. (Carried.)

REVISION OF PRIZE LIST

It was moved by ALFRED STONE, and seconded, that there be separate classes for Herefords and Polled Angus. The President, Secretary, G. E Day, Alfred Stone and David McCrae were appointed a committee to arrange the prizes in classes 3 and 4.

It was moved by HENRY WADE, seconded by G. E. DAY, that class 5 be left as it is. (Carried.)

It was moved by ARTHUR JOHNSTON, seconded by G. E. DAY, that the arrangement of special prizes be left to the Executive. (Carried.)

It was moved by HENRY WADE, seconded by J. C. SNELL, that the arrangement of the dairy prizes be left to the Executive of this Association, and to the representatives from the Dairy Associations. (Carried.)

LIVE STOCK TRADE WITH SOUTH AMERICA.

Mr. Hill, Secretary of the Toronto Industrial, addressed the meeting briefly on the upbuilding of a trade in live stock with the countries in South America. Hearing a discussion on the advancement of our trade in live stock with South America, the idea came to me that it would be a good thing for our Government to invite these countries to appoint delegates to come here in the fall, we to pay their expenses while they were here and take them around to various fall fairs. In this way they would see what class of live stock this country can produce. They would be here perhaps a month, and I think the railway companies would give them free transportation, and the whole cost should not amount to more than $1,000. I thought this might be the means of getting up a trade in live stock with South America.

The following letter was then read from Mr. Wm. Linton, Aurora:

AURORA, Feb. 22nd, 1897.

F. W. HODSON, ESQ.,
Guelph, Ont.

DEAR SIR,—A short time ago I had a conversation with Mr. H. J. Hill, of the Toronto Industrial Exhibition. He suggested that the live stock breeders should unite and ask the Governments to contribute say $1,000 each and send to the Argentine Republic, and have some of their representative stock men come here to our next fall shows, and see for themselves what we can do for them in the stock line. I think this a capital suggestion, and we should at once try and adopt it. We could get a good strong deputation together on short notice if you would undertake it and have Mr. H. J. Hill along. He is satisfied we can bring them for the above named sum, or perhaps less, and eventually do the country a lot of good. There is one thing certain, that we shall never do anything by sitting still and making no effort. So now go at it and let us do something and that at once.

Yours very truly,
WM. LINTON.

It was moved by D. McCRAE, seconded by H. WADE, that this matter be left for the Executive to deal with. (Carried.)

SELECTION OF JUDGES FOR THE WINTER FAIR.

It was moved by D. McCRAE, seconded by H. WADE, that Thos. Crawford, M.P.P., Toronto, be asked to act as judge on cattle. (Carried.)

It was moved by Capt. WM. ROLPH, seconded by J. C. SNELL, that ROBERT MILLER, Brougham, be asked to act as judge. (Carried.)

It was moved by A. JOHNSTON, seconded by D. McCRAE, that JAMES SMITH, Brantford, be asked to act as reserve judge. (Carried.)

REPORT OF THE TREASURER.

It was moved by H. WADE, seconded by G. W. CLEMONS, that the Treasurer's report be adopted. (Carried.)

SECRETARY'S REPORT.

The report of the Secretary was taken as read and adopted up to the clause, "Questions now under consideration.

MONTHLY LIST

The suggestion contained in the report of the Secretary that a list of the members of this Association be published monthly together with a list of the animals each member has for sale, was strongly opposed by Mr. J. C. Snell. Mr. Snell said that he did not think the Government grant should be used for the purpose of furthering the business of private individuals. Besides this, he did not think the members would send in a list of the stock they had for sale; he did not think he would go to the trouble of doing so. He had noticed that even in the agricultural papers the men who did the most advertising often had the poorest stock.

Mr. McCrae was in favor of publishing a list every three months, but was not in favor of naming the prices at which the various animals were offered.

G. E. Day: We sometimes lose sight of the fact that this Association is for the benefit of the members; and in dealing with matters of this kind, though it may possibly have an injurious effect upon the agricultural press, for which we would all feel sorry, I do not think we are bound to put very strong stress on this fact if we consider that the publishing of these lists would be for the uplifting of the Association in general. Monthly, perhaps is a little too frequently; and publishing prices is a question.

It was moved by J. C. Snell, seconded by G. W. Clemons, that this matter be left to a committee of five to be appointed by the chairman. (Carried) The Chairman nominated the following committee: President, Vice-President, Secretary, and Messrs. Day and McCrae.

STANDARD OF EXCELLENCE.

It was moved by J. C. Snell, seconded by G. E. Day, that the Executive be instructed to out the suggestion of the Secretary regarding a standard of excellence. (Carried.)

OFFICIAL AUDITOR.

It was moved by David McCrae, seconded by John I. Hobson, that the Executive be instructed to employ an official auditor to audit the books of this Association. (Carried)

PRIZES OF JAMES YULE.

Letters were read from Mr. Sibbald and Mr. James Yule regarding the registration certificates of animals shown by Mr. Yule at the Provincial Winter Show.

It was moved by D. McCrae, seconded by H. Wade, that prizes won by James Yule at the Provincial Winter Show be paid. (Carried.)

It was moved by G. E. Day, seconded by David McCrae, that the Cattle Breeders Association increase the salary of the Secretary by $50, making it $150 per year. (Carried.)

It was decided to do nothing regarding the appointment of veterinary and legal advisers.

The meeting then adjourned.

NINTH ANNUAL REPORT

OF THE

DOMINION SHEEP BREEDERS' ASSOCIATION.

1896-7.

LIST OF MEMBERS OF THE SHEEP BREEDERS' ASSOCIATION FOR 1896 AND 1897

Name.	Address.	Class.
Arkell, Henry	Teeswater, Ont	Oxfords.
Armour, Andrew	Dunnville, Ont	Leicesters.
Arkell, Henry	Arkell, Ont	Oxfords.
Armstrong, George B	Teeswater, Ont	Leicesters.
Arkell, Peter	Teeswater, Ont	Oxfords.
Brown, Alfred	Picton, Ont	Shropshires.
Birdsall, F. & Son	Birdsall, Ont	Oxfords,
Bonnycastle, F. & Son	Campbellford, Ont	Cotswolds.
Beattie, W. H	Wilton Grove, Ont	Shropshires.
Brown John L	Uxbridge, Ont	Cotswolds.
Baker, George & Son	Simcoe, Ont	Southdowns.
Bowman, James	Guelph, Ont	Horned Dorsets.
Conworth, John	Paris, Ont	Shropshires.
Campbell, J. & J. K	Palmerston, Ont	Leicesters.
Campbell, John	Woodville, Ont	Shropshires.
Cousins, John & Sons	Harriston, Ont	Oxfords
Calder, Chas	Brooklin, Ont	Shropshires.
Currelley, T. & Son	Fullarton, Ont	Leicesters.
Campbell, James K	Palmerston, Ont	Leicesters.
Dickeson, Wm	Mildmay, Ont	Oxfords.
Douglas, T. C	Galt, Ont	Southdowns.
Dickin, John	Milton West, Ont	Shropshires.
Donaldson, W	South Zorra, Ont	Shropshires.
Davies, Robert	Toronto, Ont	Shropshires.
Dryden, Hon. John	Brooklin, Ont	Shropshires.
Elliott, Andrew	Galt, Ont	Shropshires.
Everett, G. P	Mount Vernon, Ont	Shropshires.
Evans, Smith	Gourock, Ont	Oxfords.
Elliott, W. R	Hespeler, Ont	Oxfords.
Elliott, Andrew	Pond Mills, Ont	Oxfords.
Ewing, J. B	Dartford, Ont	Shropshires.
Frink, B. H	Napanee, Ont	Cotswolds.
Ficht, Valentine	Oriel, Ont	Cotswolds.
Ganton, D. G	Saurin, Ont	Shropshires.
Gould, G. sr	Rutherford, Ont	Lincolns.
Gibson, J. T	Denfield, Ont	Lincolns.
Gardhouse, J. M	Highfield, Ont	Leicesters.
Gowanlock, Robert	Maple Hill, Ont	Leicesters and Oxfords.
Garnham, E. A	Straffordville, Ont	Leicesters.
Gibson, Richard	Delaware, Ont	Shropshires.
Gibson & Walker	Ilderton, Ont	Lincolns.
Humphrey, E	Thamesford, Ont	Lincolns.
Honey R	Brickley, Ont	Cotswolds.
Hastings, R	Wingham, Ont	Leicesters.
Hallam, John	Toronto, Ont	Dealer hides, etc.
Hawkshaw, W. S	Glanworth, Ont	Shropshires.
Hanmer, D. G. & Sons	Mount Vernon, Ont	Shropshires.
Harding, R. H	Thorndale, Ont	Horned Dorsets.
Hunter, John	Wyoming, Ont	Horned Dorsets.
Holtby, R M	Manchester, Ont	Horned Dorsets.
Hine, H. J	Dutton, Ont	Oxfords.
Hobson, John I	Guelph, Ont	
Jackson, John	Abingdon, Ont	Southdowns.
Jull, J. H	Mount Vernon, Ont	Oxfords.

LIST OF MEMBERS OF THE SHEEP BREEDERS' ASSOCIATION.—*Concluded.*

Name.	Address.	Class.
Kelly, John	Shakespeare, Ont	Leicesters and Hampshires.
Laidlaw, W. G	Wilton Grove, Ont	Cotswolds.
Lea, H. F	Consecon, Ont	Horned Dorsets.
Little, Robert E	Teeswater, Ont	Leicesters
Moyer, D. H	Camden, Ont	Shropshires.
Martin, Wm	Binbrook, Ont	Southdowns.
Miller, R	Brougham, Ont	Shropshires.
Miller, John	Markham, Ont	Southdowns.
Moore, J. D	Galt, Ont	
Martin, R. G	Maryville, Ont	Leicesters.
McKellar, John	Avonton, Ont	Horned Dorsets
McCrae, David	Guelph, Ont	Southdowns and Cotswolds.
McFarlane, Jas	Clinton, Ont	Shropshires.
McGillivray, John A	Uxbridge, Ont	Horned Dorsets.
Oliver, Wm	Avonbank, Ont	Lincolns.
Orr, John	Galt, Ont	Leicesters.
Parkinson, E	Eramosa, Ont	Lincolns.
Parks, John	Burgessville, Ont	Cotswolds.
Phinn, J. P	Hespeler, Ont	Shropshires.
Rutherford, John	Roseville, Ont	Southdowns.
Robson, Thos. E	Ilderton, Ont	Lincolns.
Russell, Jas	Richmond Hill, Ont	Cotswolds.
Rutherford, T. C	Kemptville, Ont	Horned Dorsets.
Simenton, Arthur	Blackheath, Ont	Southdowns.
Smith, W. M. & J. C	Fairfield Plains, Ont	Merinos.
Snell, J. C	Snelgrove, Ont	Cotswolds.
Snell, J. G. & Bro	Snelgrove, Ont	Cotswolds.
Storm, Peter	Sherkston, Ont	Oxfords.
Smith, J. S	Maple Lodge, Ont	Leicesters.
Smith, Thos. W	Glanford, Ont	Southdowns.
Stevens, R. W	Lambeth, Ont	Lincolns.
Slater, John	Buttonville, Ont	Cotswolds.
Shore, T. Hardy	Glanworth, Ont	Cotswolds.
Sorby, D. & O	Gourock, Ont	
Stonehouse, Wm	Wyoming, Ont	
Tolton, Jas	Walkerton, Ont	Oxfords.
Thompson, Wm	Uxbridge, Ont	Cotswolds.
Thompson, Jas	Mildmay, Ont	Suffolks.
Thompson, John	Uxbridge, Ont	Cotswolds.
Telfer, A. & Sons	Paris, Ont	Southdowns.
Turner, Elmer	Burford, Ont	Oxfords.
Terrill, A	Wooler, Ont	Oxfords.
Whitesides, T. M	Innerkip, Ont	Shropshires.
Waters, Thos	Rockwood, Ont	Cotswolds.
Wright, W. E	Glanworth, Ont	Shropshires.
Whitelaw, Andrew	Guelph, Ont	Leicesters.
Wood, C. E	Freeman, Ont	Leicesters.
Weeks, Geo	Glanworth, Ont	Cotswolds.
Wright, Herbert	Guelph, Ont	Oxfords.
Whitelaw Bros., A. & W	Guelph, Ont	Leicesters.
Wren, Christopher	Uxbridge, Ont	Shropshires.
Wightman, R	Owen Sound, Ont	Sole agent for the Dominion for "Little's Sheep and Cattle Wash."

DOMINION SHEEP BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Sheep Breeders' Association convened in the City Hall, Guelph, December 9th, at 7.30 p.m., the President, Mr. Jas. Tolton, in the chair. After the President's address, which is published on page 29, the committee appointed to devise some plan for the improvement of judging at district, county and township fairs, stated that they had no report to give, no meeting having been called. The committee was re-elected and instructed to report at the next annual meeting. The committee is as follows : John Campbell, D. G. Hanmer and Richard Gibson.

The Secretary then read a letter received from the Hon. Sidney Fisher, asking that a committee be appointed from the Sheep Breeders' Association to meet the Tariff Commission. It was moved by Robert Millar, seconded by David McCrae, and carried unanimously, "That the President, Vice-President, and Messrs. John Campbell and Alex. Smith be a committee to place the views of this Association before the tariff commission."

It was moved by Alex. Smith, seconded by Jas. Russell, and carried, "That this Association memorialize the Minister of Agriculture of the Dominion respectfully requesting him that when appointing an agriculturist for the Dominion, he appoint not only a practical farmer, but also a man who is in close touch with the breeders of live stock, and one well acquainted with their needs, and that a copy of this resolution be forwarded to the Honorable the Minister of Agriculture."

It was unanimously resolved, "That believing that contagious pleuro-pneumonia and other dreaded diseases are not at present existing in the United States or Canada, this Association is of the opinion that as long as these countries are free from contagious diseases, cattle of all kinds should be admitted to either country without quarantine, but after careful and efficient veterinary inspection, under such regulations as may be mutually agreed upon between the two countries."

Messrs. Richard Gibson, Jas. Russell and J. C. Snell were appointed a committee to ascertain the facts concerning the Prince of Wales' prize, and, if possible, to procure it as a prize to be awarded annually at the Provincial Winter Fair.

The reports of the delegates to fair boards were accepted as read and ordered to be printed in the annual report.

Officers for 1897.

President, Jas. Tolton, Walkerton ; Vice-President, D. G. Hanmer, Burford ; Secretary-Treasurer, F. W. Hodson, Guelph. Directors : Cotswolds, J. C. Snell, Snelgrove ; Leicesters, Alex. Smith, Maple Lodge ; Southdowns, John Jackson, Abingdon ; Shropshires, R. Gibson, Delaware ; Oxfords, Henry Arkell, Arkell ; Hampshires, John Kelly, Shakespeare ; Lincolns, John Gibson, Denfield ; Dorsets, R. H. Harding, Thorndale ; Merinoes, W. M. Smith, Fairfield Plains ; General Director, John I. Hobson, Guelph. Auditors : G. E. Day, O. A. C., Guelph, and Andrew Whitlaw, Guelph.

COMMITTEES.

Executive, Programme, and Transportation : President, Vice-President, Secretary, and Messrs. John Jackson and R. H. Harding.

Delegates to the Provincial Winter Fair : Messrs. John Jackson, D. G. Hanmer and R. H Harding.

Delegates to Fair Boards : Toronto, Jas. Russell, Richmond Hill, and J. C. Snell, Snelgrove ; Ottawa, Jos. Yuill, Carleton Place ; Montreal, Daniel Brims, Athelestan, Que. ; London, R. H. Harding, Thorndale, and Alex. Smith, Maple Lodge ; Kingston, Alf. Brown, Picton ; Peterboro', Robert Vance, Ida ; Belleville, J. M. Hurley, Belleville.

EXPERT JUDGES.

Cotswolds : J. C. Snell, Snelgrove ; Wm. Thompson, Uxbridge ; John Thompson, Uxbridge ; Thos. Teasdale, Concord ; Jas. Russell, Richmond Hill ; Jas. Main, Milton ; H. Rawlings, Ravenswood ; V. Ficht Oriel ; Geo. Weeks, Glanworth ; T. Hardy Shore, Glanworth ; W. G. Laidlaw, Wilton Grove ; D. McCrae, Guelph ; B. H. Frink, Napanee ; J G. Snell, Snelgrove ; Peter McGregor, Mimosa ; Wm. Rae, Arkell ; Wm. Ward, Uxbridge ; Joseph Ward, Marsh Hill ; John Park, Ariel ; Wm. S. Coxworth, Whitby ; Jas. Murray, Cresswell ; Jos. D. Davidson, Belhaven.

Leicesters : E. Parkinson, Eramosa ; John Orr, Galt ; William Watt, Salem ; Wm. McIntosh, Burgoyne ; Thos. Currelly, Fullarton ; R. Eastwood, Mimico ; John Kelly, Shakespeare ; R. Hastings, Wingham ; Andrew Thompson, Fergus ; J. K. Campbell, Palmerston ; J. C. Snell, Snelgrove ; Jos. Snell, Snelgrove ; G. B. Armstrong, Teeswater ; John Gibson, Denfield ; Wm. Cowan, Galt ; C. E. Wood, Freeman ; Jos. Gaunt, St. Helen's ; Jas. Gaunt, St. Helen's ; J. M. Gardhouse, Highfield ; John Laidlaw, Wilton Grove ; Andrew Whitlaw, Guelph ; Wm. Whitlaw, Guelph ; Jas. Snell, Clinton ; R. C. Martin, Marysville ; Alex. Smith, Maple Lodge ; A. Easton, Appleton For Toronto, 1897 : Jas Snell, Clinton ; R. Eastwood, Mimico. For London, 1897 : J. C. Snell, Snelgrove. For Ottawa, 1897 : J. M. Gardhouse, Highfield. For Montreal, 1897 : John Orr, Galt.

Dorsets : Thomas Hector, Springfield-on-the-Credit ; John Jackson, Abingdon ; Richard Gibson, Delaware ; John Campbell, Woodville ; R. H. Harding, Thorndale ; T. S. Cooper, Coopersburg, Pa. ; M. A. Cooper, Coopersburg ; John Hunter, Wyoming ; Capt. A. W. Young, Tupperville ; G. P. Everett, Mt. Vernon.

Southdowns : John Millar, Markham ; A. Simenton, Black Heath ; Wm. Martin, Binbrook ; R. Gibson, Delaware ; John Jackson, Abingdon ; T. C Douglas, Galt ; D. G. Hanmer, Burford ; Henry Arkell, Teeswater ; W. H. Beattie, Wilton Grove.

Oxfords : Smith Evans, Gourock ; Jas. Tolton, Walkerton ; R. J. Hine, Dutton ; Henry Arkell, Arkell ; Wm. Dickenson, Mildmay ; Peter Arkell, Teeswater ; Herbert Wright, Guelph ; John Harcourt, St. Ann's ; J. H. Jell, Mt. Vernon ; Henry Arkell, Teeswater ; John E. Cousins, Harriston ; Elmer Turner, Burford ; Arch. McKenzie, Corwhin ; R. E Birdsall, Birdsall ; W. R. Elliott, Hespeler ; Geo. McKerrow, Sussex, Wis. ; W, A. Shafor, Middleton, O. ; Aaron Bordwell, Fargo, N. Y. ; J. C. Williamson, Xenia, O.

Hampshires : Henry Arkell, Arkell ; Henry Arkell, Teeswater ; R. Gibson, Delaware ; I. Hillier, Tourtown, Mich. ; John Kelly, Shakespeare.

Lincolns : J. T. Gibson, Denfield ; Wm. Oliver, Avonbank ; E. Parkinson, Eramosa ; T. E. Robson, Ilderton ; G. Walker, Ilderton ; John Geary, London ; J. C. Snell, Snelgrove ; James Brooks, Whalen ; John Lee, Highgate ; Richard Gibson, Delaware ; Alex. Smith, Maple Lodge.

Merinoes : J. P. Everett, Mt. Vernon ; Rock Bailey, Union ; Andrew Tirrell Wooler ; J. B. Moore, Galt ; D. G. Hanmer, Burford.

Shropshires: Richard Gibson, Delaware; G. P. Everett, Mt. Vernon; J. Conworth, Paris; W. H. Beattie, Wilton Grove; A. Brown, Picton; Robert Miller, Brougham; J. Hanmer, Burford; James McFarlane, Clinton; J. Cooper, Kippen; T. M. Whitesides, Innerkip; J. Campbell, Woodville; D. G. Hanmer, Burford; Jas. Phinn, Hespeler; M. Levering, Lafayette, Ind.; A. Elliott, Galt; S. H. Todd, Wakeman, O.; J. Dickin, Milton West; John L. Thompson, Gas City, Ind.; George Allen, Allerton, Ill.; W. G. Pettit, Freeman; D. J. Campbell, Woodville; G. Phinn, Hespeler; Chas. Calder, Brooklin; H. N. Gibson, Delaware. For Toronto, 1897: W. H. Beattie, Wilton Grove, and W. G. Pettit, Freeman; reserve, T. M. Whitesides, Innerkip. For London, 1897: R. Miller, Brougham; reserve, J. Conworth, Paris. For Montreal, 1897: R. Gibson, Delaware; reserve, W. H. Beattie, Wilton Grove. For Ottawa, 1897: Alf. Brown, Picton; reserve, George Phinn, Hespeler.

The meeting, which was the most largely attended and most successful ever held by the Association, then adjourned to meet at the call of the Secretary.

PRESIDENT'S ADDRESS.

By James Tolton, Walkerton.

This being the first opportunity since you elected me President of this Association, allow me to thank you for the honor you have conferred on me. I have held some of the highest positions in municipal as well as in other lines, but look on being President of the Dominion Sheep Breeders' Association as being one of the most honourable as well as the most important of them all. Is not the sheep industry one that not only gives pleasure and comfort to our lives, but adds materially to our wealth? If it had not been that it has been customary on the part of my predecessors at our annual meetings to give a written or make an oral address, I do not think I should have taken upon myself to do so on this occasion. It is the duty of the president of every association or society not only to review the conduct or the business for the past, but also to make some forecasts for the success in the future. I wish it were in my power to say that the sheep industry had been as profitable to the breeder and dealer as I would like it to have been. From the press I learn that from the port of Montreal there were shipped to the British markets 80,672 sheep, a decrease in numbers of 136,728 head from 1895, and even this limited trade was not at all profitable to the dealer; a loss to the dealer must in the end react on the producer. This decrease in export trade is due, no doubt, in a large measure, to the embargo being placed on the entry of Canadian sheep into the British markets by the authorities there.

Then again how has it been with the breeder of pure breeds? He has not found the demand as brisk and the prices as remunerative as they at one time were. I think it is not hard to find the cause for this. The American breeders have been in the past, and in all probability will be in the future, our best customers, and they from more causes than one have not been purchasing as freely as in the past. But notwithstanding these discouragements, have the breeders of sheep reason to be discouraged or go out of the business? I think not. Has not the sheep industry been as profitable as any other line on the farm?

But enough regarding the past; what about the outlook for the future? In my opinion we have every reason to hope and have renewed courage. From the official bulletin issued by the United States Department of Agriculture, we are told that there has been a decrease of 23,458,355 sheep in the world since 1893, and of that decrease two-fifths, or 9,385,344 has been in the United States. Now what does this mean to us? The real or imaginary objection that the American sheep breeders had with their tariff in reference to wool has been met. The doubt and uncertainty of their Presidential election is now over. Their press tells us that a fresh activity has arisen in their

business situation and with it a demand for more sheep. To meet that demand we are, on account of our geographical position and our climate, in the most favourable locality. I think I may confidently predict that in the incoming year we may look for a brisker demand and higher prices.

But allow me to say a word of warning. Whichever of the pure breeds we may select let us aim to breed the best of their kind.

Gentlemen, before closing, allow me to draw your attention to a circular letter addressed to our indefatigable secretary by the Honorable the Minister of Agriculture for the Dominion. Many, if not all of you, have been supplied with a copy. In the circular the Minister draws our attention to the fact that the Government have in view a revision of the tariff, and to the end that this may be done to meet the wishes of the people as fully as possible, a committee of the Government are taking evidence and meeting with representatives of the different industries and branches of business. I would suggest, therefore, that if our business is hampered in any way by the present tariff regulations these grievances be freely discussed here, so that formal and concerted action may be taken to have them brought to the notice of the Government.

REPORTS OF REPRESENTATIVES TO FAIR BOARDS.

Toronto Industrial.

As one of the delegates to the Toronto Industrial Fair Board, I attended the only meeting for which I received notice, namely for revision of the prize list and appointment of judges. The delegates were courteously received and heard, and careful consideration was given to all suggestions and recommendations. The Industrial Board has made liberal provision for the exhibition of sheep, both as to accommodation and prizes, and the result has been the greatest show of sheep to be seen at any fair in the world. Canadian sheep breeders may well be proud of the display they made at Toronto this year.

J. C. Snell.

As a delegate to the Toronto Industrial Exhibition, I found the officers of the association willing to do all they could to accommodate exhibitors, with this exception, they wanted sheep to be longer on exhibition than formerly. This I opposed, but at a directors' meeting in Guelph, or London, the meeting decided in favor of the extension of time asked for. In my opinion there is too much time wasted, and of no benefit whatever to the sheep breeders of Canada. In regard to recommendations, the system of selecting judges at some of the large shows is not satisfactory. I refer to the Quebec Provincial, where one judge goes over all breeds. This, I believe could be remedied if taken up by the Sheep Breeders' Association.

Jas. Russell

Western Fair.

At the Western Fair Board meetings of 1896, which I attended as a delegate from the Sheep Breeders' Association, the attention of the members of the Board seemed to be very much taken up with the contemplated new buildings, and they seemed very anxious to have suggestions from the delegates of live stock associations, but I am sorry to say they did not carry them out in several cases, especially in the arrangement for the accommodation and comfort of the stock on exhibition as well as the attendants. But I am pleased to inform you that the Board have seen and understood the mistake, and will have the necessary changes made before another exhibition is held The desire of the Board as a whole, and of the very accommodating secretary, Mr. Thos. Browne, in particular, is to make the Western Fair as pleasant as possible to exhibitors. And th is

much more difficult to do than at Toronto, because of the seeming impossibility to get entries in in reasonable time, as many of the entries are made after the awards are announced in Toronto, and, indeed, after the stock are on the grounds at London. In this way the management have very little knowledge of the space required until the stock are mostly all on the grounds. The new buildings are a grand improvement on the old ones, and with some changes and additions promised for next year, they will be among the best in Canada. We did not succeed in getting any addition to the prize list, but received a promise that if the fair this year was a success, as expected, then an enlarged prize list would follow. The "success" came, and we have great expectations for next year.

A. W. Smith.

As representatives to the Western Fair Board, we were cordially received but accomplished little. The plans of the new stock buildings were produced, and the mode of ventilation in some was strongly condemned by myself and others. We were assured that it it was required the necessary changes would be made at the time of the exhibition. This was required but not done.

R. H. Harding.

Montreal.

I was not asked to attend any meetings of the Montreal Fair Board, not having sent in my papers to the exhibition company, so I can not tell how I was received. I was in Montreal during two days of the show, and saw some of the judging, which was quite satisfactory.

Daniel Brims.

Ottawa.

I attended a meeting of the executive of the Ottawa Fair Board, but on account of the amount of building being done was not able to do much with the increase of prizes. The judging is done by two judges, one on the fine wool and one on the coarse wool sheep. I would suggest that a few men be named capable of judging all classes, out of which the direc'ors could choose a man capable of judging all the different breeds.

Jos. Yuill.

Peterborough.

The sheep exhibit at Peterborough this year was good, fully up to last year, which is saying a good deal. If the sheep industry gets another boom the directors will have to provide more pens, as this year they were crowded very much. Cotswolds, Leicesters, Shropshires, Oxfords and Southdowns were well represented both in numbers and in quality. There were two judges on long wools, but I do not think it was any improvement on former years, when there was only one good expert. There was only one judge for the fine wools, and he gave entire satisfaction. Your delegate was well received at the Board meetings, and also at the fair. The Board appeared much pleased to have a representative from your Association.

Robert Vance.

Kingston.

Delagate : Alfred Brown, Picton. No show held.

Belleville.

D elegate : J. C. Hanley, Read. show held.

DIRECTORS' MEETING.

A directors' meeting of the Dominion Sheep Breeders' Association was held in the Palmer House, Toronto, March 24th, 1897, the President, Mr. Jas. Tolton, in the chair. The following officers and directors were present: Jas. Tolton, Walkerton; D. G. Hanmer, Burford; John Jackson, Abingdon; R. H. Harding, Thorndale; G. E. Day, Guelph; Henry Arkell, Arkell; J. T. Gibson, Denfield; John Kelly, Shakespeare; David McCrae, Guelph; Richard Gibson, Delaware; John I. Hobson, Mosboro'; J. C. Snell, Snelgrove; W. M. Smith Fairfield Plains, and F. W. Hodson, Toronto.

Live Stock Commissioner.

Mr. David McCrae addressed the meeting for a few minutes, setting forth the action taken by the Cattle Breeders' Association regarding the appointment of a live stock commissioner, whose work it would be to look after the interests of the breeders of live stock. He would necessarily be a man in close touch with the breeders of this country. The following gentlemen were appointed to act in conjunction with the committee from the Cattle Breeders' Association: Messrs. J. C. Snell, F. W. Hodson, and John Jackson.

It was moved by D. G. Hanmer, seconded by John Jackson, that the minutes of the last annual meeting be accepted as read. (Carried.)

Report of the Tariff Committee.

Mr. Hanmer: A most harmonious meeting of the representatives from the live stock associations was held. We went over the tariff from an agricultural standpoint, and a number of recommendations were made. Mr. Alex. Smith was appointed a delegate from the Sheep Breeders' Association to place our views before the Commission.

Mr. Hobson: I have been excessively busy, and furthermore, I did not take notes on what had been done. I feel now that what I should have done was to make a report which could have been embodied in the report of the Secretary. The committees met and we went carefully over the tariff. The Commission listened to us attentively but were entirely non-committal. The recommendations made were similar to those made by the Cattle Breeders' Association.

The report of the committee was accepted.

Report of Committee on Prince of Wales' Prize.

Richard Gibson: We have scarcely a definite report to make. We interviewed the Minister of Agriculture, and have been instructed to say that the Government will take into their serious consideration the request you have made. Mr. Dryden said that if he found that the cattle had had the prize last, the sheep would have it this year, and *vice versa*. He promised to let us know the result of his consideration on Friday. We were also bold enough to suggest that as the prize has not been awarded for some years past, that we should have the accumulated funds.

It was moved by J. C. Snell, seconded by John I. Hobson, that it be an instruction from this meeting to the committee appointed to interview the Minister of Agriculture re Prince of Wales' Prize, that in our opinion it is very desirable that in granting this money to be competed for it should in all cases be given to live stock associations of a Provincial character, viz: Dominion Cattle, Sheep, Swine, and Horse Breeders' Associations. (Carried.)

It was moved by G. E. Day, seconded by R. H. Harding, that the committee to present the above motion be Richard Gibson, Jas. Russell, and J. C. Snell. (Carried.)

Appointment of Committees.

Executive, Programme and Transportation: President, Vice-President, Secretary, and Messrs. John Jackson and R. H. Harding.

Delegates to the Winter Fair Association: Messrs. John Jackson, D. G. Hanmer, and R. H. Harding.

Transportation.

Mr. Macdonald, of Montreal, addressed the meeting on the question of transportation, speaking along the same line as at the meeting of the Cattle Breeders' Association. He advocated that animals should be allowed to travel at a rate according to their actual weight. He considered the tariff in force in Texas, which is arranged in this way, a model. The matter was left to the Transportation Committee to confer with Mr. Macdonald.

Instructions to Delegates to Fair Boards.

It was moved by D. G. Hanmer, and seconded by John Jackson, that our delegates to the Toronto Industrial Fair Board be instructed to ask that a special superintendent for the sheep department be appointed. (Carried.)

It was moved by John Jackson, seconded by John I. Hobson, that our delegates to the London Fair Board be instructed to ask that the stock be better arranged in the buildings than it has been in the past, also to make any other suggestions they may think necessary. (Carried.)

Revision of Rules Governing the Winter Show.

It was moved by D. G. Hanmer, seconded by J. T. Gibson, that in the revised rules No. 5, all after "Classes" be expunged, and insert "shall be American or Canadian bred." (Carried.)

In clause 6, sheep not exhibiting shall be charged $1.00 per head.

Moved by G. E. Day, seconded by John I. Hobson, that the Secretary be instructed to prepare separate rules for each department of the Winter Show. (Carried.)

It was moved by John Kelly, seconded by John I. Hobson, that sheep remain in the ring for a short time after the prizes are awarded. (Carried.)

Secretary's Salary.

It was moved by John I. Hobson, seconded by D. G. Hanmer, that the Secretary's salary be increased to $150. (Carried unanimously.)

Judges for the Provincial Winter Fair.

Cotswolds: Joseph Snell, Snelgrove; Joseph Gaunt, St. Helen's; Reserve, E. Parkinson, Eramosa.

Lincolns: E. Parkinson, Eramosa; Joseph Gaunt, St. Helen's; Reserve, Joseph Snell, Snelgrove.

Leicesters: Joseph Gaunt, St. Helen's; Joseph Snell, Snelgrove; Reserve, E. Parkinson, Eramosa

Shropshires: Mortimer Levering, Lafayette, Ind., or W. H. Beattie, Wilton Grove; Henry Arkell, Teeswater; Reserve, William Martin, Binbrook.

Southdowns: William Martin, Binbrook; Henry Arkell, Teeswater; Reserve, Mortimer Levering, Lafayette, Ind., or W. H. Beattie.

Oxfords: Henry Arkell, Teeswater; Mortimer Levering, Lafayette, Ind., or W. H. Beattie; Reserve, William Martin, Binbrook.

Horned Dorsets and Hampshires: Mortimer Levering, Lafayette, Ind, or W. H. Beattie; Henry Arkell, Teeswater; Reserve, William Martin, Binbrook.

Grades: Joseph Snell, Snelgrove; Henry Arkell, Teeswater; Reserve, Joseph Gaunt, St. Helen's.

Treasurer's Report.

The report of the Treasurer was read and adopted.

Auditor.

It was moved by Richard Gibson, seconded by J. C. Snell, that the Executive be instructed to employ an official accountant to audit the books of this Association; the expenses not to exceed $25 for the four Associations. (Carried.)

Secretary's Report.

It was moved by Richard Gibson, seconded by J. C. Snell, that the report of the Secretary be adopted and left to the Executive to deal with. (Carried.)

Live Stock Trade with South America.

A letter was read from Mr. Wm. Linton, Aurora, suggesting that a deputation be sent to the Dominion Government to ask that a grant be given to pay the expenses of delegates from countries in South America while visiting our fall fairs. These delegates would see at these fairs the classes of stock produced in this country and would report accordingly on their return home. If the report were favorable it would be the means of building up a trade in live stock with these countries.

Mr. Richard Gibson: "I do not believe any good could be done in this way. The better course to pursue would be to send a man to ascertain just what it would cost to place stock on these markets, what course to pursue to get the stock on the market, also the mode of selling; then, if the Government could be induced to render any assistance, for them to pay for the transportation and have the stock placed on the market free, the breeders to supply the stock for this purpose and take the chance of prices. If we once get a start there I am satisfied we can keep that market."

Nothing definite was done regarding this matter, and the meeting adjourned.

NINTH ANNUAL REPORT

OF THE

DOMINION SWINE BREEDERS' ASSOCIATION,

1896-97.

LIST OF MEMBERS OF SWINE BREEDERS' ASSOCIATION 1896 AND 1897.

Name.	Address.	Class.
Arkell, Henry	Arkell, Ont	Berkshires.
Atkinson, Wm	Wardsville, Ont	Duroc Jerseys.
Ackland, John	Delaware, Ont	Berkshires.
Anderson, A. Y	Wyoming, Ont	Berkshires.
Blain, N. M	St. George, Ont	Tamworths.
Brandon, A. W	Walshingham Centre, Ont.	Tamworths.
Brethour, J. E	Burford, Ont	Yorkshires.
Bell, John	Amber, Ont	Tamworths.
Bennett, Geo. and Pardo	Charing Cross, Ont	Chester Whites.
Bennett, Jos	South Buxton, Ont	Poland Chinas.
Berdan & McNeill	Strathburn, Ont	Duroc Jerseys.
Bonnycastle, F. & Son	Campbellford, Ont	Berkshires.
Boynton, P. W. & Son	Dollar, Ont	Berkshires.
Brownbridge, J. T	Ashgrove, Ont	Tamworths.
Bow Park Co. Limited	Brantford, Ont	Berkshires and Yorkshires.
Brown, F. W	Portage La Prairie, Man	Berkshires.
Bowman, W. R	Mount Forest, Ont	Yorkshires and Berkshires.
Boucher, Geo	Meadowvale, Ont	Berkshires.
Brooks, Thos. & Son	Brantford, Ont	Chester Whites.
Butler, Wm. & Son	Dereham Centre, Ont	Chester Whites and Victorias
Burgess, R. L	Burgessville, Ont	Berkshires.
Bruce Bros	Gormley, Ont	Berkshires.
Bond, S. J	Mount Brydges, Ont	Berkshires.
Brien Ed	Ridgetown, Ont	Berkshires.
Bray, Jas	Longburn, Man	Yorkshires.
Booth, J. R	City View, Ont	Berkshires.
Brown Bros	Springville, Ont	Berkshires.
Brownlee, Jos	Shawville, Que	Poland Chinas.
Bennett, H. & Son	St. Williams, Ont	Berkshires.
Bate, L. W. & Son	Brighton, Ont	Poland Chinas.
Beingessner, F. X	Mildmay, Ont	Chester Whites.
Bowman, W. A	Bluedale, N. Y	Yorkshires.
Cairn, Jos	Camlachie, Ont	Chester Whites.
Caldwell Bros	Orchardville, Ont	Yorkshires.
Clarke, Wm	West Lorne, Ont	Poland Chinas.
Chalk, J. H	Calton, Ont	Chester Whites.
Clifford, Frank	Wellington, Ohio	Yorkshires.
Coxworth, S.	Whitby, Ont	Berkshires.
Cox, T. A	Brantford, Ont	Berkshires.
Cousins, John & Son	Harriston, Ont	Yorkshires.
Chute, H. J	Somerset, N. S	Chester Whites.
Capes, Henry	Aberarder	Poland Chinas.
Chaplow, Mr	St. Thomas, Ont	Chester Whites.
Cressman, Israel	New Dundee, Ont	Berkshires.
Cline, W. W	Appleby, Ont	Yorkshires.
Carter, E. H	Portage La Prairie, Man	Tamworths.
Cherry, John	Nobleton, Ont	Tamworths.
Conroy, R. & W	Deschenes, Que	Tamworths.
Chinnick, Jas & Ed	Chatham, Ont	Berkshires.
Clark, Wm	North Wiltshire, P. E. I	Yorkshires.
Callbeck, J. W	St. Augustine Cove, P. E. I	Chester Whites.
Curtis, C. H	Warkworth, Ont	Chester Whites.
Coulson, Jas	Hornby, Ont	Yorkshires.
Clark, J. H	Calton, Ont	Chester Whites.
Clark, J. G	Ottawa, Ont	Yorkshires.
Clark, J. B	Blenheim, Ont	Chester Whites.
Christie, Jas	Winchester, Ont	Chester Whites.

LIST OF MEMBERS OF SWINE BREEDERS' ASSOCIATION.—*Continued.*

Name.	Address.	Class.
Davis, C. G	Freeman, Ont	Yorkshires.
Davis, H. J	Woodstock, Ont	Berkshires.
Day, N	Powle's Corners, Ont	Yorkshires.
Dawson, Fred	Collingwood, Ont	Tamworths.
Decker, C. R	Chesterfield, Ont	Berkshires.
Deddles, Henry	Kossuth, Ont	Yorkshires.
Dyment, S	Barrie, Ont	Berkshires.
Denison, J. R	Denison's Mills, Que	Chester Whites.
Dickinson, Wm	Mildmay' Ont	Berkshires.
Dorrance, Jas	Seaforth, Ont	Berkshires and Yorkshires.
Drury, Oliver	Fargo, Ont	Poland Chinas.
Duch, Wm. J	Morpeth, Ont	Berkshires.
Doe, Chas. C	South Newbury, Vt	Tamworths.
Dowdle, Samuel	Balder, Man	Berkshires.
Duncan, G. L	Morganston, Ont	Tamworths.
Dale, John	Glendale, Ont	Chester Whites.
Dunn, Andrew	Ingersoll, Ont	Tamworths.
Dool, E	Hartington, Ont	Yorkshires.
Dorsey, R	Burnhamthorpe, Ont	Suffolks.
Demaray & Son	Stratford, Ont	Yorkshires.
Drummond, Samuel	Almonte, Ont	Chester Whites.
Dunn, Ed	Plover Mills, Ont	Berkshires.
Duthie, Jas	Melgund, Man	Berkshires.
Dryden, Hon. John	Brooklin, Ont	Berkshires.
DeCourcey, D	Bornholm, Ont	Chester Whites.
Edwards, W. C	Rockland, Ont	Berkshires.
Elliott, Andrew	Galt, Ont	Tamworths.
Elder, Jas	Virden, Man	Berkshires.
Edwards, Edwin	North Wiltshire, P. E. I	Yorkshires.
Evoy, H. W. & Son	Bar River, Ont	Berkshires.
Elliott, A	Pond Mills, Ont	Tamworths.
Everett, W. W	Chatham, Ont	Berkshires.
Elliott, Wm. T	Hamilton, Ont	Tamworths.
Empey, John	Brandon, Man	Berkshires.
Empey, W. N	Napanee, Ont	Yorkshires.
Ewing, J. B	Dartford, Ont	Berkshires.
Fahner, Chris	Crediton, Ont	Berkshires, Poland Chinas, and Duroc Jerseys.
Featherston, Jos. M.P	Streetsville, Ont	Suffolks, Yorkshires, Essex.
Ferguson, Jos	Vesta, Ont	Tamworths.
Frank, A. & Sons	The Grange, Ont	Southdowns, Durhams, Suffolks, Thoroughbred Horses.
Fraser, D. & Son	Emerson, Man	Poland Chinas.
Frink, B. H	Napanee, Ont	Berkshires and Yorkshires.
Fraser, I. O. & Son	Fellows, Ont	Duroc Jerseys.
Fisher, W. W	Benmiller, Ont	Poland Chinas.
Foster, G. E	Knowlton, Que	Tamworths.
Fulton, John, jr	Brownsville, Ont	
Gibson, Wm. T	Marshfield, P. E. I	Berkshires.
Graham, D. A	Parkhill, Ont	Berkshires.
Gaffield, N. C	Castleton, Ont	Berkshires.
Gardner, F. A	Brittania, Ont	Berkshires.
Graham, Andrew	Pomeroy, Man	Yorkshires.
Garbutt, T. C	Claremont, Ont	Berkshires.
Greenway, Hon. Thos	Winnipeg, Man	Berkshires and Yorkshires.
Gier, Geo	Grand Valley, Ont	Yorkshires.
Greenshields, J. N	Danville, Que	Yorkshires
Golding, Henry	Thamesford, Ont	Chester Whites and Tamworths.
George, E. D	Putnam, Ont	Chester Whites.
Gregg, H. & Sons	Salford, Ont	Berkshires.
George, H. & Sons	Crampton, Ont	Chester Whites.
Green, Geo	Fairview, Ont	Berkshires.
Gowdy, W. Y	Fairfield Plains, Ont	Berkshires.
Gilroy, C. J. & Son	Glen Buell, Ont	Berkshires.

LIST OF MEMBERS OF SWINE BREEDERS' ASSOCIATION.—*Continued.*

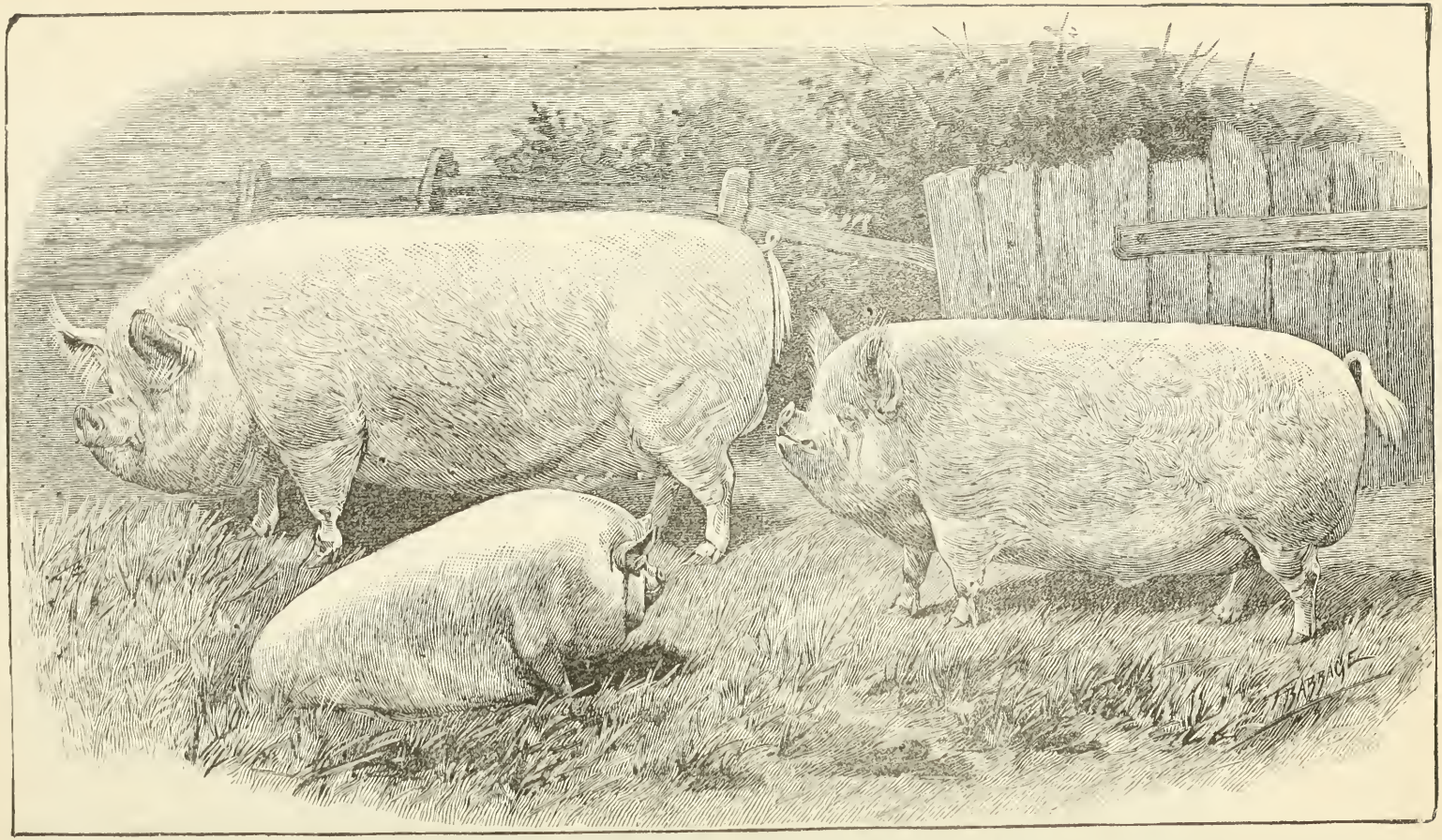
Name.	Address.	Class.
Goodyer, Wm. & Son	Woodstock, Ont	Yorkshires.
Greenwood, Thos	Douglas, Man	Berkshires.
Gibson, R.	Delaware, Ont	Berkshires.
Gibson, Robert	Galt, Ont	Berkshires.
Golden, J. H	Amherstburg, Ont	Berkshires.
Gummer, Geo. A	Colborne, Ont	Chester Whites.
Harding, R. H	Thorndale, Ont	Chester Whites.
Hawkins, D	Woodville, Ont	Berkshires.
Hanley, J. C	Read, Ont	Berkshires.
Hallman, A. C	New Dundee, Ont	Tamworths.
Hauser, Ignatius	Weisenberg, Ont	Berkshires.
Hart, Alex	Hampstead, Ont	Berkshires.
Hainsworth, C. E	Marquette, Man	Berkshires and Yorkshires.
Hyslop, Robert	Brantford, Ont	Berkshires.
Hurley, J. M. & Son	Belleville, Ont	Yorkshires.
Hood, G. B	Guelph, Ont	Yorkshires.
Horton, Ed	New Dundee, Ont	Berkshires.
Hartman, J. W	Elmbridge, Ont	Berkshires.
Henderson, W. C	Keady, Ont	Berkshires.
Holmes, C. W	Amherst, N. S	Poland Chinas.
Hall, Alonzo	Lambeth, Ont	Tamworths.
Holmes, M	Walsh, Ont	Duroc Jerseys.
Hord, John & Son	Parkhill, Ont	Suffolks.
Hurry, Henry R	Charlottetown, P. E. I	Yorkshires.
Hurlburt, B. J	Clymer, N. Y	Yorkshires.
Haycraft, W. J	Agincourt, Ont	Berkshires.
Hall, Andrew, jr	Ayr, Ont	Berkshires.
Howe, Wm	North Bruce, Ont	Yorkshires
Herron, Henry	Avon, Ont	Chester Whites.
Hyde, Geo. V	Shakespeare, Ont	Yorkshires.
Holland, Isaac	Culloden, Ont	Tamworths.
Hoover, Alf	Green River, Ont	Tamworths.
Hume, Alex. & Co	Burnbrae, Ont	Yorkshires.
Hawkens, Dennis	Woodville, Ont	Berkshires.
Irwin, J. I	Stewart, Ont	Poland Chinas.
Jones, Wm	Zenda, Ont	Poland Chinas.
Jones, E. A	Kertch, Ont	Berkshires.
Jones, W. & H	Mt. Elgin, Ont	Yorkshires
Jarvis, Paul	Florence, Ont	Duroc Jerseys.
Johnston, Arthur	Greenwood, Ont	Berkshires.
Jeffs, E. & Son	Bond Head, Ont	Berkshires and Yorkshires.
Kitching, John	Corwhin, Ont	Berkshires.
Kipp, E. A	Chilliwack, B. C	Berkshires.
King, Wm	Oakley, Assa	Berkshires.
Kitson, Wm	Burnside, Man	Berkshires.
Kneal, J. A	Holbrook, Ont	Poland Chinas.
Kipp, Henry	Chilliwack, B. C	Berkshires.
Lemon, S	Kettleby, Ont	Berkshires.
Leatherdale, E	Morden, Man	Berkshires.
Lloyd, E. A	Stouffville, Ont	Berkshires.
Lang, R. L	Oak Lake, Man	Berkshires.
Lawrie, R. J., & Bro	Wolverton, Ont	Tamworths.
Livingstone, J. A	Grattan, Ont	Tamworths.
Morse, John	Amherst, N. S	Chester Whites.
Martin, E. E	Canning, Ont	Berkshires.
Martin, R. J	Maryville, Ont	Berkshires and Yorkshires.
Maloney, F. A	Chapeau Que	Yorkshires
Meredith & Dunlop	Thorncliffe, Ont	Poland Chinas.
Mullen, Jas. A	Cypress River, Man	Berkshires.
Mutch, J. F	Pilot Mound, Man	Berkshires.
Moulton, Thos	Harlem, Ont	Berkshires.
Meyer, John	Kossuth, Ont	Berkshires.

LIST OF MEMBERS OF SWINE BREEDERS' ASSOCIATION.—*Continued.*

Name.	Address.	Class.
Marter, J. Y.	New Dundee, Ont.	Yorkshires and Tamworths.
Master, Levi	Haysville, Ont.	Tamworths.
Muir, E. H.	High bluff, Man.	Berkshires.
Morrison, Alex	Carman, Man.	Berkshires.
Milton, W. J.	Thamesville, Ont	Berkshires.
Mairs, J. & G.	Oak Ridges, Ont.	Berkshires.
Martin, W. H	Warden, Que.	Berkshires.
McKnigh, S. J	Epping, Ont	Yorkshires.
McCreery, Wm.	Trehern, Man.	Berkshires.
McEachern Bros.	Argyle, Ont.	Chester Whites.
McBeth, R. S	Oak Lake, Man.	Berkshires.
McGregor, Joseph	Manitou, Man.	Berkshires.
McEwen, James	Kertch, Ont.	Berkshires.
McEwen, James	Glendale, Man	Berkshires.
McMullen, R. B	Goldsmith, Ont.	Poland Chinas.
McFarlane, Archie	Dunmore, Ont.	Berkshires.
McDonald, John	Palgerow, Ont	Berkshires.
McAllister, W.	Varna, Ont.	Berkshires.
McLeod, Kenneth	Dugald, Man	Chester Whites.
McKenzie, Rob.	High Bluff, Man.	Berkshires and Yorkshires.
McCutcheon, H	Glencoe, Ont	Duroc Jerseys.
McGregor, James	Brandon, Man.	Tamworths.
McCowan, Robert	Portage la Prairie, Man.	Tamworths
McCann, Nathan	Vankleek Hill, Ont	Poland Chinas.
McDonald, R. N	Morganston, Ont	Berkshires.
McIntosh, Alva	Winchester Springs, Ont.	Poland Chinas.
North, George	Marden, Ont	Tamworths.
Neville, C W	Newburg, Ont.	Yorkshires.
Nichol, John C.	Hubrey, Ont	Tamworths.
Odell, W. H	Belmont, Ont.	Tamworths.
Parlee, M. H.	Sussex, N.B.	Berkshires and Yorkshires.
Park, J. C	Carnduff, Assa	Berkshires.
Playfair, A. W.	Baldur, Man.	Berkshires.
Pettit, W. G.	Freeman, Ont	Berkshires.
Pearson, S. J. & Son	Meadowvale, Ont.	Berkshires.
Paul, Jarvis	Florence, Ont.	Duroc Jerseys.
Purves, Thos	Pilot Mound, Man.	Berkshires.
Potter, A. B.	Montgomery, Ont.	Berkshires.
Pangman, Samuel	Vallentyne, Ont.	Berkshires.
Pattullo, R. A.	Alton, Ont.	Yorkshires.
Pike, John, & Son	Locust Hill, Ont.	Yorkshires.
Patch, C. W.	Brome, Que	Chester Whites.
Patterson, Wm.	Churchill, Ont.	Berkshires.
Potter, W. A.	Moscow, Ont.	Duroc Jerseys.
Plain, Samuel	Muncey, Ont.	Duroc Jerseys.
Revell, H	Ingersoll, Ont.	Tamworths.
Reed, R., & Co.	Hintonburg, Ont.	Berkshires.
Richardson, J. A.	South March, Ont	Tamworths.
Rice, George	Curries, Ont.	Poland Chinas.
Ross, A. W	Douglas, Ont	Yorkshires and Berkshires.
Russell, T	Cedarville, Ont.	Berkshires.
Rogers, G. F.	Plumas, Man	Berkshires.
Richardson, H. F.	Kerwood, Ont.	Tamworths.
Roberts, George	Hepworth Station, Ont.	Duroc Jerseys.
Shannon, Thomas	Cloverdale, B.C.	Berkshires.
Shaw, J. H	Simcoe, Ont.	Berkshires.
Snarey, B., & Sons	Croton, Ont	Duroc Jerseys and Poland Chinas
Small, A., jr.	Melbourne, Ont	Berkshires.
Snell, J. C.	Snelgrove, Ont	Berkshires.
Snell, J. G., & Bro.	Snelgrove, Ont	Berkshires.

LIST OF MEMBERS OF SWINE BREEDERS' ASSOCIATION.—*Concluded.*

Name.	Address.	Name.
Spears, Thomas	Oak Lake, Man	Berkshires.
Semple, J. A	Brule, N.S	Berkshires.
Snyder, Gideon, jr	Jarvis, Ont	Berkshires.
Semple, John	Tottenham, Ont	Duroc Jerseys.
Smith, W. M. & J. C	Fairfield Plains, Ont	Chester Whites.
Shrigley, John	Allandale, Ont	Berkshires.
Siefert, J. H	North Bruce, Ont	Berkshires.
Smith, J., & Sons	Duntroon, Ont	Berkshires.
Simenton, J. H	Chatham, Ont	Tamworths.
Siprell & Carroll	Bornholme, Ont	Berkshires.
Smith, H. D	Compton, Que	Yorkshires.
Stirtzinger, F. H	Fenwick, Ont	Poland Chinas.
Scott, F. W	Highgate, Ont	Yorkshires.
Sanderson, Thomas	Holland, Man	Berkshires.
Small, J. H	Kelso, Que	Berkshires.
Sheppardson, W. J	Walter's Falls, Ont	Berkshires and Chester Whites.
Smyth, R. L	Fargo, Ont	Poland Chinas.
Seymour, R. F	Essex, Ont	Berkshires.
Simmons & Quirie	Ivan, Ont	Berkshires.
Shaw, A. J. C	Thamesville, Ont	Berkshires.
Shibley, W. J	Harrowsmith, Ont	Berkshires.
Shaw, James A	Winsslow Road, P.E.I	Chester Whites.
Smyth, Joseph M	Chatham, Ont	Poland Chinas.
Smith, H. D	Compton, Que	Yorkshires.
Shipley, H. N	Charing Cross, Ont	Berkshires
Taylor, J. & H	Richmond, Que	Yorkshires.
Tape Bros	Ridgetown, Ont	Duroc Jerseys.
Thomson, John	Uxbridge, Ont	Berkshires.
Teasdale, Thomas	Concord, Ont	Berkshires.
Treherne, F. W	Brantford, Ont	Berkshires.
Thompson, George	Bright, Ont	Berkshires.
Thompson, S. J	Carberry, Man	Yorkshires
Totter, A. B	Montgomery, Assa	Berkshires.
Treverton, Charles	Belleville, Ont	Poland Chinas and Tamworths.
Terrill, A	Wooler, Ont	Yorkshires.
Tuttle, Jed	Iroquois, Ont	Poland Chinas.
Trottier, Francis	Lochiel, Ont	Yorkshires.
Tierheller, E. E	Mt. Elgin, Ont	Berkshires.
Vance, Ed	Emerson, Man	Chester Whites.
Vance, Robert	Ida, Ont	Berkshires.
Watt, J. & W. B	Salem, Ont	Berkshires.
Walsh, George	Onslow Centre, Que	Tamworths.
Warrilow, John	Owen Sound, Ont	Chester Whites.
Webster, Andrew	Andrewsville, Ont	Yorkshires and Berkshires.
Wilson, Mrs. A. J	Pittsfield, Ohio	Yorkshires.
Willis, R., jr	Glen Meyer, Ont	Poland Chinas.
Wylie Bros	Cardinal, Ont	Berkshires.
Wilson, Wm. C	East Oro, Ont	Yorkshires.
Wells, James	Virden, Man	Berkshires.
Wells, A. C., & Son	Chilliwack, B.C	Berkshires.
Whitesides Bros	Innerkip, Ont	Berkshires.
Wilkinson, Thomas	Hamilton, Ont	Berkshires.
Wood, C. E	Freeman, Ont	Poland Chinas.
Wrigley & Fox	Turgoose, B.C	Berkshires.
Wilson, Finlay	Franklin Centre, Que	Chester Whites.
Wardell, J. B	Washington, Neb	
Wardell, G. H	Washington, Neb	
Webster, R. A	Merrickville, Ont	Berkshires.
Yuill, Joseph, & Sons	Carleton Place, Ont	Berkshires
Young, A. W	Tupperville, Ont	Poland Chinas.



LARGE WHITE,
LITTLE WHITE.

MIDDLE WHITE.

(English Classification.)

DOMINION SWINE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Swine Breeders' Association was held on December 10th, at 7.30 p.m., the President, Mr. Jos. Brethour in the chair. After the President's address, the reports of the delegates to the various Fair Boards were read and adopted.

It was moved by G. B. Hood, seconded by S Coxworth, and unanimously carried, "That this Association memorialize the Minister of Agriculture of the Dominion, respectfully requesting him that when appointing an Agriculturist for the Dominion, he appoint not only a practical farmer, but also a man who is in close touch with the breeders of live stock, and one well acquainted with their needs, and that a copy of this resolution be forwarded to the Honorable the Minister of Agriculture."

A letter from the Hon. Sidney Fisher was read by the Secretary, asking that a committee be appointed to give the views of the Dominion Swine Breeders' Association before the Tariff Commission. The following gentlemen were appointed a committe for this purpose: The President, Messrs. Wm. Jones, Jos. Featherstone, M.P., and Richard Gibson.

It was moved by R. H. Harding, and seconded by Capt. Young, "That it is the opinion of this Association that the Fair Boards should be asked to charge for space instead of per head, as is now the rule." Carried.

Messrs. Wm. Jones, R. H. Harding and G. E. Day were appointed a committee to prepare details of the above scheme and to present their report at the next executive meeting.

It was moved by George Green, seconded by Thomas Teasdale, and carried unanimously: "That the Dominion Swine Breeders' Association in their annual meeting assembled, respectfully petition the management of the Toronto Industrial Exhibition to provide suitable accommodation for the swine exhibits at their show, the present buildings being totally insufficient and unfit for the proper display of the exhibits, dangerous to the health of the animals, and anything but conducive to the comfort and convenience of visitors; and that this Association urge the directors to provide sufficient accommodation before the time for holding the next exhibition.

OFFICERS FOR 1897.

President.—J. E. Brethour, Burford.

Vice-President.—George Green, Fairview.

Secretary-Treasurer.—F. W. Hodson, Guelph.

Directors.—Yorkshires, G. B. Hood, Guelph; Berkshires, Thomas Teasdale, Concord; Suffolks, R. Dorsey, Burnhamthorpe; Chester Whites, R. H. Harding, Thorndale; Poland Chinas, Wm. Jones, Mt. Elgin; Essex, Jos. Featherstone, M.P., Streetsville; Tamworths, Andrew Elliott, Galt; Duroc Jerseys, W. E. Butler, Dereham Centre; General Director, J. C. Snell, Snelgrove.

Auditors.—John I. Hobson, Guelph, and R. Snell, Snelgrove.

COMMITTEES.

Executive, Programme and Transportation.—President, Vice-President, Secretary, and Messrs. Hood and Snell.

Delegates to the Board of the Provincial Winter Fair.—The President, Vice-President, and Mr. Andrew Elliott.

Representatives to Fair Boards.—Toronto Industaial, Thomas Teasdale, Concord, and J. E. Brethour, Burford; Ottawa, Jos. Featherstone, M.P., Streetsville, and Jos. Yuill, Carleton Place; Kingston, J. M. Hurley, Belleville, and B. H. Frink, Napanee; Belleville, J M. Hurley, Belleville; Montreal, T. D. McCallum, Danville, Que., and J. G. Mair, Howick, Que.; Peterborough, R. Vance, Ida; Guelph, G. B Hood, Guelph, and Jas. Anderson, Guelph; London, George Green, Fairview, and R. H. Harding, Thorndale.

Expert Judges.

Berkshires.—H. J. Davis, Woodstock; J. C. Snell, Snelgrove; Thos. Teasdale, Concord; George Green, Fairview; Robert Vance, Ida; T. A. Cox, Brantford; Jas. Quarrie, Delaware; Jos. Featherstone, M.P., Streetsville; S. Coxworth, Whitby; R. P. Snell, nelgrove; Malcolm McArthur, Lobo; C. R. Decker, Chesterfield, J. G. Snell, Snelove; Chas. Youngs, Brooksdale; Wm. Jones, Zenda; D. DeCourcey, Bornholm.

Yorkshires.—Richard Gibson, Delaware; Henry Deddels, Kossuth; Sharpe Butterfield, Windsor; J. E Brethour, Burford; G. B. Hood, Guelph; Jos. Featherstone, M.P., Streetsville; H. E Sharpe, Ida; A F. McGill, Hillsburg; J. G. Mair, Howick, Que.; G. Beaudet, Valleyfield, Que; J. M. Hurley, Belleville; Geo Greer, Grand Valley; R. H. Harding, Thorndale; H. C. Eyre, Harlem; Jas. Stephen, Trout River, Que.

Chester Whites.—Wm. Jones, Zenda; J. C. Snell, Snelgrove; George Green, Fairview; J. E. Brethour, Burford; D. DeCourcey, Bornholm; R. Dorsey, Burnhamthorpe; R H. Harding, Thorndale; W. E. Butler, Dereham Centre; Sharpe Butterfield, Windsor; G. B. Hood, Guelph; G. E. Day, Guelph; Thos. Teasdale, Concord; J. Y. Ormsby, Woodstock; S. H. Todd, Wakeman, Ohio.

Poland Chinas.—Thos. Teasdale, Concord: S. H. Todd, Wakeman, O.; Jos. Featherstone, M.P., Streetsville; J. H. Snarey, Croton; Jas. Main, Milton; Capt. A. W. Young, Tupperville; George Green, Fairview; Wm. Smith, Fairfield Plains; Jos. Brethour, Burford; Wm. Jones, Zenda; Oliver Drury, Fargo; R. Dorsey, Burnhamthorpe.

Duroc Jerseys.—Jos. Featherstone, M.P., Streetsville; Peter Lamarsh, Wheatley; Wm. Jones, Zenda; R. Dorsey, Burnhamthorpe; J. G. Snell, Snelgrove; Geo. Green, Fairview; D. G. Hanmer, Burford; Sharpe Butterfield, Windsor; Thos. Teasdale, Concord; S. H. Todd, Wakeman, O.; Jos. McGarvin, Chatham; R. H. Harding, Thorndale; D DeCourcey, Bornholm.

Tamworths.—N. H. Blaine, St. George; A. Dunn, Ingersoll; J. H. Simonton, Chatham; G. North, Marden; A. Elliott, Galt; L. F. Master, Haysville; A. C. Hallman, New Dundee; F. Shore, London; J. Bell, Amber; D. G. Hanmer, Burford; John Nicol, Hubrey; Jos. Brethour, Burford; H. Caldwell, Orchard; W. Elliott, Hamilton.

Essex.—Sharpe Butterfield, Windsor; R. Dorsey, Burnhamthorpe; Jas. Main, Milton; David McCrae, Guelph; Jas. Anderson, Guelph; J. C. Snell, Snelgrove.

Suffolks.—Sharpe Butterfield, Windsor; John Thompson, Uxbridge; John Groat, Snelgrove; Malcolm McArthur, Lobo; Simon Lemon, Kettleby; T. C. Douglas, Galt; Wm. Elliott, Milton; James Millar, Guelph.

The meeting, which was the most largely attended and most successful ever held by the Association, then adjourned to meet at the call of the Secretary.

REPORTS OF REPRESENTATIVES TO FAIR BOARDS.

Toronto Indusirial.

I beg to hand in my report as one of your delegates to the Industrial Board of Toronto. In company with Mr. Teasdale, I attended one meeting of the Board of Directors, called for the purpose of revising the prize list, and appointing judges upon the different classes of live stock. The judges appointed in the swine department were selected from persons named as qualified judges by the Dominion Swine Breeders' Association. As delegates, we endeavored to secure for the swine classes as much money as the board would grant. We were not fully satisfied with the amounts granted, owing to the inferior accommodation provided for swine in comparison to the splendid buildings furnished for the use of other departments of live stock. We felt that for this reason alone more money should be granted. We were also of opinion, when the cost of exhibiting and the important position that the hog and his products maintain in this country is taken into consideration, greater prominence should be given to the swine exhibit on the live stock prize lists. We are informed that some dissatisfaction has been caused by combining the Suffolk and Essex breeds into one class. We cannot see why this should be, when the breeders of these classes approve of having them shown together at the winter fat stock show, an exhibition held under their own patronage.

There is a matter to which I wish the attention of exhibitors drawn. It is to the great dissatisfaction that prevails among the exhibitors of swine at the payment for extra entries for animals that are brought for sale purposes only. We do not question the right of the fair boards to charge extra entry fees upon such animals, but the great injustice arises from not furnishing sufficient and suitable accommodation for those who pay for it. I have frequently noticed very valuable animals seriously injured through being compelled to crowd three or four animals into a pen too small for one. If some of our exhibitors were to bring an action against the fair boards for damages sustained by animals through improper accommodation, it would be the means of bringing about a better state of affairs.

J. E. Brethour.

I attended two meetings of the Toronto Industrial Fair Board, the annual meeting and a meeting for the revision of the prize list and the appointment of judges. On both occasions I was cordially received. The Board is quite willing to hear suggestions from your delegates with reference to classification of stock. We recommended a change in the classification of swine. This was afterwards adopted by the Board, which, I think, will be satisfactory to the members of the Swine Breeders' Association generally. All persons appointed to act as judges in the swine department were selected from the list of expert judges named at the annual meeting. We did not succeed in obtaining any increase in the prize money for swine. This, I think, is too low as compared with other stock. We received no definite promise as to when new pens would be built, but if a Dominion exhibition is held in Toronto next year, and they obtain a grant from the Dominion Government, some of it will probably be spent in building better accommodation for swine.

Thos. Teasdale.

Western Fair.

As delegates from the Swine Breeders' Association to the Western Fair Board, we were well received, but failed to accomplish anything in the interest of our Association, with the exception of the appointment of expert judges. We tried every possible way to have the prize money increased for all classes of swine, but failed to do so, the Board stating that on account of the expensive buildings that were being erected for all classes of stock it would be impossible, this year, to increase the prize list.

George Green.

As representatives to the Western Fair Board, we were cordially received, but we accomplished little. The plans of the new stock buildings were produced at a committee meeting. Mr. George Green and myself, with others, strongly condemned the mode of ventilation, especially for swine. We were assured, that, if it was required, the necessary changes would be made at the time of the exhibition. This was required but none done. However, it is quite probable that a new building will be erected for swine before the fair of 1897. I would suggest that this Association prepare plans for such, and submit them to the management for their consideration.

R. H. Harding.

Guelph Central.

As a delegate from the Swine Breeders' Association to the Guelph Central Exhibition, I have nothing special to report this year. I was kindly received and my suggestions listened to, but as the prize list had to be reduced, the swine department had to suffer with the others. We are greatly in need of expert judges at these exhibitions, but owing to the cost of getting them from a distance, the directors will not always consent to have them, and the result is often great dissatisfaction with the judging.

G. B. Hood.

The exhibit of pigs at the Guelph Central for this year was excellent, especially in Improved Yorkshire class. In aged sows the exhibit was equal to anything shown in Toronto. As suggested by the Dominion Swine Breeders' Association for the last two years, we have given a prize for "Boar and four of his get," also for "Sow and four of her produce." This brought out a good competition. Last year and this year we also added a class for Tamworths. Owing to expense, expert judges were not employed, and there was considerable dissatisfaction with the awards. It is probable that hereafter expert judges will be employed.

Jas. Anderson.

Peterborough.

I attended several meetings of the Peterborough Fair Board and also the fair. As your delegate I was well received by the Board. We had a very good exhibit of swine, although not as good in numbers as in some former years. We have now got all the breeds represented; we had Poland Chinas on our prize list for the first time, and had some good ones on exhibition. Berkshires, Chester Whites, Yorkshires and Tamworths were represented by some very good animals. The accommodation for swine is excellent, and the prize list is now fairly good. Two judges officiated and gave general satisfaction.

Robert Vance.

Ottawa.

I attended an executive meeting of the Ottawa Fair Board, but on account of them doing so much building I was unable to accomplish anything, with the exception of having a class added for Tamworths.

Jos. Yuill.

Kingston.

Delegates: J. M. Hurley, Belleville, and B. H. Frink, Napanee. No fair was held.

Belleville.

Delegate: J. M. Hurley. Held no fair.

Montreal.

Delegates: Geoffrey Beaudet, Valleyfield, Que., and Wm. Tait, St. Laurent, Que.

DIRECTORS' MEETING.

A meeting of the Directors of the Dominion Swine Breeders' Association was held in the Palmer House, Toronto, March 25th, 1897, the President, Mr. J. E. Bethour, in the chair. The following officers and directors were present: Geo. Green, Fairview; R. H. Harding, Thorndale; W. E Butler, Dereham Centre; W. H. Jones, Mt. Elgin Andrew Elliott, Galt; Thos. Teasdale, Concord; G. B. Hood, Guelph; F. W. Hodson, Guelph; and J. C. Snell, Snelgrove.

Live Stock Commissioner.

Mr. McCrae addressed the meeting for a few minutes on the action taken by the Cattle and Sheep Breeders' Associations regarding the appointment of a live stock commissioner for the Dominion.

It was moved by J. C. Snell, seconded by Geo. Green, that we endorse the steps taken by the other Associations, and that Thos. Teasdale and Major G. B Hood be a committee to confer with the committees appointed by the Cattle and Sheep Breeders' Associations *re* this matter. (Carried.)

It was moved by G. B. Hood, seconded by Geo. Green, that the minutes of the last meeting be taken as read and adopted. (Carried.)

Report of the Tariff Committee.

Jos. Bethour: I was at the meeting of the Tariff Committee held at Guelph, and after conferring with the representatives from the other Associations we decided upon making the following requests, and placed our case before the Commission:

General:

1. Urge the removal of the duty on corn.
2. The reduction of the duty on coal oil.
3. A reduction of the duty on agricultural implements and tools.
4. The duty on wind-mills to be as low as that on agricultural implements.
5. Duty to be removed on binder twine.
6. A reduction of the duty on articles made from wool; all specific duties to be removed.
7. All duties on agricultural seeds to be removed.
8. The reduction of the duty on wire fencing and other wire.

Specific:

1. Recommend that the duty on dressed pork be retained.
2. Recommend that pigs be not slaughtered in bond, while disease is so prevalent in the United States.
   - (*a*) For fear of introducing cholera.
   - (*b*) The American pigs are scavengers and produce inferior products. If these are sold as Canadian articles it would be an injury to our European trade.
3. Free corn.
   - (*a*) Distillers are allowed to bring in free corn.
   - (*b*) All corn used will enhance the value of our farms, increasing the fertility of the soil.
   - (*c*) The lower provinces are allowed to import corn when it is to be made into meal.

4. Prohibit the importation of cottolene, oleomargarine, and other compositions that come into competition with pork and dairy products.

5. We want to have our records recognized by the United States.

Election of Committees.

Executive and Programme: President, Vice President, Secretary, and Messrs. Hood and Snell.

Transportation.

Mr. G. S. Macdonald, of Montreal, who has been making a close study of the transportation rates on live stock, then addressed the meeting for a short time. He said that from what information he had obtained, both by correspondence and intercourse, he had come to the conclusion that the rates for the transportation of live stock now in force in Canada were exorbitant. He believed that the proper way in which to arrange a tariff would be so that stock could travel at a rate according to actual weight. This is the plan adopted in Texas, and he considered it a model. The matter was left in the hands of the transportation committee to deal with.

The Secretary: I think if a deputation from this Association met with the tariff commissioners we could get the rates cut in two. If the Sheep and Swine Breeders' Associations had gone to the same trouble as the Cattle Breeders' Association have done, this would have been accomplished this year. What I would advise now is the appointment of a very strong transportation committee which must be prepared to do a lot of hard work. No man should allow his name to come before the meeting who is not willing to do this. I also think it wise that we appoint here an official legal adviser. We are at a great disadvantage in coming before a large corporation of this kind. If we had had such a one when we appeared before the commissioner for the Cattle Breeders' Association we could have obtained even better rates than we have.

It was moved by Andrew Elliott, seconded by W. E. Butler, that the executive committee also be the transportation committee. Carried.

Delegates to the Board of the Provincial Winter Fair.

It was moved by J. C. Snell, seconded by Thos. Teasdale, that the delegates from this Association to the Board of the Provincial Winter Fair be the President, Vice-President, and Mr. Andrew Elliott. Carried.

Secretary's Salary.

It was moved by Andrew Elliott, seconded by W. E. Butler, that the salary of the secretary be advanced $100 per year, making it $200. Carried.

Sheep and Swine Breeders' Associations in Manitoba.

The following letter was read from Mr. Geo. H. Greig, Secretary of the Sheep and Swine Breeders' Associations in Manitoba:

Winnipeg, Man., March 17th, 1897.

Mr. F. W. Hodson,
Secretary Dominion Swine Breeders, Association,
Guelph, Ont.

Dear Sir,—At an executive meeting of the Sheep and Swine Breeders' Association of Manitoba, held in Winnipeg on March 17th, a discussion took place upon the cost of registration to our breeders in the Dominion Swine Breeders' Record. Understanding that the cost to your Association of each registration is 25c. and of each transfer 10c., it leaves you a considerable margin of profit. It is estimated that breeders

n this country pay into your Association about $300 a year, for which the only thing they receive is the registration of their stock, whereas your Association receives the profit over and above the cost of registration and transfers on all animals recorded by our breeders. The profits accrued from this source are used by your Association to encourage the swine industry of Ontario by offering premiums at your fat stock show and at other shows.

It was therefore resolved to ask your Association to offer a substantial premium at the Winnipeg Industrial Exhibition this year, in order to encourage the swine industry in this Province, and that after this date 50 per cent, of the profits made by your Association out of the registration and transfer fees received from this country, be rebated to the Sheep and Swine Breeders' Association of Manitoba, to be used at their discretion for the encouragement of the swine industry in this country.

As I understand you are having an executive meeting in Toronto next week, I trust you will lay this matter before your directors and that we will hear favorably from you at an early date. The prize list of the Winnipeg Industrial will be going to print in a short time, and if our request is complied with it will be necessary to to hear from you very soon in order to have the announcement made in the Winnipeg Industrial prize list.

Yours truly,

GEORGE H. GREIG.

It was moved by ANDREW ELLIOTT, seconded by R. H. HARDING, that the members of the Sheep and Swine Breeders' Association of Manitoba be allowed the privilege of recording their animals at the same rates as the members of this Association, also that they be given volumes of the Record at actual cost price. (Carried.)

It was moved by G. B. HOOD, seconded by W. H. JONES, that $100 be donated to the Sheep and Swine Breeders' Association of Manitoba to expend as they see fit in prizes in the swine department at the Winnipeg Fair on condition, 1st, that our Association receive full credit for same in the Prize List of the Winnipeg Fair; 2nd, that all animals winning premiums be recorded in the Canadian Swine Record; 3rd, that a copy of the Prize List, also a full report of the expenditure of the money be forwarded to the Secretary of the Dominion Swine Breeders' Association. (Carried.)

The following is the report of the committee to devise a scheme whereby fair boards can charge for space instead of per head: "We, the Committee appointed to devise a scheme whereby fair boards will be asked to charge for space instead of per head for swine as at present, beg to recommend that $1 per pen for an enclosure 7 x 9 be charged by the Toronto Industrial, and 50 cents per pen at other large fairs, as Montreal, Ottawa, and London, for pens of corresponding size. (Sgd.) WM. JONES, Chairman.

It was moved by GEORGE GREEN, seconded by ANDREW ELLIOTT, that the report be adopted. (Carried.)

LETTER FROM THE REGISTRAR OF LIVE STOCK.

The following letter was read from Mr. Wade, but as there seemed to be no probability of his request being granted, he afterwards withdrew it:

TORONTO, February 9th, 1897.

F. W. Hodson, Esq.,
Ontario Agricultural College,
Guelph, Ontario.

DEAR SIR:

Would you kindly present my case to the Executive Committee of the Swine Breeders' Association the next time they meet. All the other Associations pay for postage and for their stationery. Last year my amounts altogether from your Association were $584.80; my postage account was $38.37, and stationery account, nearly all for blank forms, $55.30, or a total of $93.72, which deducted from $584.80 leaves me only $491.08, not sufficient for the amount of work done.

The Shorthorn people have granted me two cents and a half more for doing the work for them, in all now 35 cents per pedigree. If your people would assume the stationery even, I would feel satisfied, as it seems hard that I should pay for stationery, or blank forms, one quarter of which is the amount that is returned with pedigrees, the others are used by parties for sending out pedigrees without being recorded.

Kindly call their attention to this matter, and oblige,

Yours truly,

H. WADE,
Registrar.

Revision of Rules and Prize List of Winter Show.

Is was moved by George Green, seconded by J. C. Snell, that clause 5 of the revised rules be the same as for sheep, viz., that all after "Classes" be struck out and "shall be American or Canadian bred" inserted. (Carried.)

It was moved by J. C. Snell, seconded by W. H. Jones, that "Class 23" be struck out of the prize list. (Carried.

It was moved by W. H. Jones, seconded by G. E. Day, that in the Tamworth and Jersey Red classes the prizes be the same as in the other pure-bred classes in the swine department, and that a section for "three bacon pigs" be added after each class except Grades, the prizes to be first, $15; second, $10; third, $5. (Carried.)

It was moved by G. E. Day, seconded by W. E. Butler, that the name Jersey Red be changed to Duroc Jersey. (Carried.)

It was moved by George Green, seconded by Andrew Elliott, that we accept the prize list as amended. (Carried.

Judges for the Provincial Winter Fair.

Chester Whites, Poland Chinas, Jersey Reds and Grades:—Joseph Featherstone, M. P., Streetsville: Jos. Brethour, Burford; Reserve, J. C. Snell, Snelgrove.

Berkshires, Yorkshires, Suffolks and Essex, and Tamworths:—Thomas Teasdale, Concord; W. H. Jones, Mt. Elgin; Reserve, Andrew Elliott, Galt.

The sweepstake prizes to be awarded by the acting judges in both classes.

It was moved by G. E. Day, seconded by W. E. Butler, that we have separate judges for the bacon sections, and that the selection of the judges be left to the Committee on Swine of the Provincial Winter Show, after consulting with the pork packers. (Carried.)

It was moved by G. E. Day, seconded by R. H. Harding, that the Board of the Toronto Industrial be respectfully requested to appoint a competent man as superintendent of the swine department, who shall devote his whole time to the management of this department. (Carried.)

Treasurer's Report.

The report of the treasurer was then read and adopted.

It was moved by J. C. Snell, seconded by Thomas Teasdale, that the Executive be authorized to employ an official accountant to audit the books of this Association. (Carried.)

Secretary's Report.

The report of the Secretary was adopted and referred to the Executive to deal with. The meeting then adjourned.

APPENDIX A.

CONFERENCE WITH HON. SIDNEY FISHER, DOMINION MINISTER OF AGRICULTURE.

The following notice was sent to all exhibitors and live stock breeders at the Toronto Industrial Exhibition. The Hon. Sidney Fisher, Minister of Agriculture for the Dominion of Canada, will be in the tent of the Superintendent of Farmers' Institutes at 10 a.m. Tuesday, the 8th of September, 1896, and desires to meet as many farmers and live stock breeders as possible.

All interested in agriculture or live stock are invited to attend.

The present quarantine regulations, railroad rates, and questions relating to Canadian Live Stock Records will be discussed.

Please attend at 10 a.m., when the public meeting will convene.

Over two hundred representative farmers and leading stock breeders assembled in the tent of Mr. F. W. Hodson, Superintendent of Farmers' Institutes, and Secretary of the Dominion Cattle, Sheep, and Swine Breeders' Association, at the Industrial Fair, to meet the Hon. Sidney Fisher, Minister of Agriculture for the Dominion of Canada, at 10 o'clock a.m., Tuesday, September 8th, 1896, and to lay before him matters relating to the present quarantine regulations, railroad rates, and Canadian Live Stock Records.

The meeting was called to order by the Chairman, Mr. John I. Hobson, who made the following remarks: This meeting is for a double purpose. It is to give our Minister of Agriculture for the Dominion of Canada, an opportunity to meet a number of representative farmers, and to give you an opportunity of making yourselves acquainted with the Hon. Minister. Secondly, it is to bring before the honorable gentleman matters that we think should be put in better shape. In the first place, I wish to say to the Hon. Mr. Fisher that it is a matter of great satisfaction and great pleasure to the farmers and others who take an interest in agriculture that we have at last as Minister of Agriculture not only a practical farmer, but a gentleman of high scholastic attainment; hence we think and believe that he will bring about legislation that will be to the interest of the farmers. Whatever different views we may hold regarding politics, it seems to be good omen for the people that the Premier has in his wisdom seen fit to call to the Cabinet a man possessing these qualifications, and we believe it will be a great advantage to the farmers of this country to have a practical man in charge of this department in the Dominion Government. I am almost sorry that the Hon. John Dryden, Minister of Agriculture for Ontario is present, as what I wish to say he may think a little flattering to him, but it is to his practical knowledge and the close interest he takes in matters pretaining to agriculture that a large share of the advantages, and much of the prosperity of this Province is due. He has done not a little to raise farming to a higher level since he has come into power. Now when we have a gentleman of Mr. Fisher's attainments at Ottawa, and coupled with these his earnest desire to master the intricacies and details of his department, we may reasonably expect that the same good results will follow as regards the wider field of agriculture in the Dominion of Canada. I, sir, and the many representative farmers you see here, deem it a great pleasure to meet you in this metropolitan city of the West, seeking to learn the wants and grievances of the farmer, when you would indeed have had a sufficient excuse to remain in the legislative halls at Ottawa.

I will now, gentlemen, take up the matters which the members of the Association, through the Executive, think it important to bring before the honorable gentleman. The report of a meeting in Ottawa at which the committee went very fully into the matters

which we are now discussing, will give you to understand that he has not heard these for the first time, and that they have been brought before the members of the House. I might say, Mr. Fisher, that the matters which we wish to bring before you are quarantine regulations, railroad rates, and matters pretaining to Canadian Live Stock Records. It is only proper that I should speak on these matters myself. I will do so briefly before asking other gentlemen to take them up. The matter of quarantine regulations has been pretty fully discussed by the leading stock men of the Dominion, and I believe they are unanimous in the opinion that the quarantine regulations between the United States and Canada should be greatly modified or wiped out altogether. Most of us are well aware that there is a great demand for our stock on the other side, and that our herds will be benefitted by a greater freedom in the importation of thoroughbred stock. It is held by those who have gone into the matter fully, that there are no infectious diseases in either country. It is felt that the time has come when, if we wish to keep up our herds to that high perfection and worth that have always characterized them in the past, when they have swept the field before them wherever shown, we must have recourse to the importation and infusion of new blood. If we are to sustain this high standard we must have greater freedom in the importation of animals of a fixed type, as developed by the breeders of the Old Country. The importation of cattle is simply impossible owing to the present quarantine regulations. What we want is to have them modified.

With regard to transportation, early last spring a deputation was appointed to wait upon the railway authorities. We found the G.T.R. was very ready to agree to our demands. However, I have been told by one of our prominent shippers that they have again gone back and are giving us some trouble.

There is the matter of records. Our records are not accepted on the other side of the line. It is well known that many of the records of this country are of a higher standard and of greater value than those issued in the United States; but they are not accepted on the other side, and our breeders have to register over there or else be shut out of the country. This is doubtless intended to build up trade to the injury of Canadian stock breeders.

I may say for your information, sir, that we have here some of the most progressive and prominent stock men of the Dominion. We have with us Lieut.-Col. McCrae, Arthur Johnston, J. C. Snell, and a number of others who stand at the very head of the Stock Breeders' Associations. There is the Registrar of Live Stock, who is conversant with the whole question, the Hon. the Minister of Agriculture for Ontario, and Mr. F. W. Hodson, who is thoroughly posted in all the details and familiar with the different questions under discussion. I will now call upon Col. David McCrae, of Guelph.

Col. McCrae: Regarding quarantine regulations I had intended going into the history of the past, but I will pass over that. We had a very good trade with the United States, and sold some animals that were a great profit to our American neighbors. Then came the days of pleuro-pneumonia, and it cost them a vast sum of money to have that disease stamped out in Cook County, but before it was stamped out their cattle were scheduled in England. For a time afterward we had free admission of Canadian cattle. This was afterwards loss to us as we all know. The Americans then claimed that they had stamped out pleuro-pneumonia and wished to get equal privileges, and the matter was again brought up in England, they claimed that while they knew positively that they had no pleuro-pneumonia over there, they could not be responsible for Canada, and so our cattle have now to be put under a ninety days schedule. There is no trade between the two countries. I hold that it is advantageous to the two countries that there should be trade. I think that we have a great many cattle that it would pay our American friends to buy. I know, as you also know, that it is often of great advantage to Canadian breeders to be able to buy cattle over there. Is there pleuro-pneumonia in the United States? If we had a competent man to inspect the herds and localities it would put us in a safe condition. Of course no quarantine regulations should be adopted that cannot be at once changed in case of danger to our herds. That is what we ask, that we have a quarantine that will allow American cattle to pass the border without

unnecessary delay. We hear a great deal about preferential trade, and we farmers think that if we are to have preferential trade established with Great Britain, we should begin by asking Great Britain to relax those restrictions on our cattle that we may have them admitted alive into the British markets. One other matter, the tuberculosis test. There may be difference of opinion as to whether it is a safe test. We have been alarmed over much regarding this disease as affecting public health. Some of the most eminent authorities such as Prof. Bang, of Denmark, and Prof. Noscard, hold that the flesh of tuberculous animals is not injurious to public health; that therein is very little danger if any; when is is cooked there is indeed no danger. There is only danger when it is spread through the whole animal, and the flesh may, in fact, in other cases, be eaten raw. There is no danger to the public health, but there are some alarmists who claim that there is great danger. There is only danger in using the milk if the cow has tuberculosis of the udder, and only then when the milk is used solely as an article of diet, such as in the case of invalids or infants. I would not say how far that test should be done away with. Our beef breeds are going decidedly back. Our steers are not so many or so good as in former years; the dairy breeds are to be held responsible to some extent for this, as you cannot raise beef breeds from dairy stock; and the sooner this matter of importation is dealt with the quicker the standard of our herds will be improved. I thank you for your attention.

Mr. Arthur Johnston, of Greenwood, being called upon to speak regarding transportation, said: The railway people have argued that the shippers of live stock have complained without cause. We have always supposed, believed, and felt sure that we have had to pay excessive rates on shipments, especially shipments of small lots. When business was good we did not complain, but business is now cut up so much, and everything is being brought down to a rock-bottom basis, that we do not feel like paying a single farthing that we think is not properly due. One of the principal grievances to shippers of small lots of stock at present is that if you sell a bull for $40 you will have to pay the half of a second class rate for a man to go with him, whether the man goes or not I have paid for the fare of the man when I did not send the man. While this is a grievance that we feel must very soon be done away with, we also think that the charge on a single animal is very much in excess of the weight or space that it occupies, and we think that these excessive rates ought to be done away with. We have argued with the G. T. R. that they are nearly as much interested in the dissemination of these animals as breeders, and we believed that if the matter was pressed with the proper authorities that we would be granted the relief sought. Mr. Reeves, General Freight Agent of the G. T. R., agreed in our opinion regarding this matter and the interest that the railways had in the distribution of thoroughbred stock. Mr. Reeves was almost as strong in his opinions regarding the matter as Mr. Hobson and myself. He laid the blame on the smaller railways. Mr. Reeves granted our request regarding the discontinuance of collecting a fare for a man with each shipment, but the very next shipment I had, the same trouble arouse, and I wrote Mr. Reeves regarding it. I have a letter from Mr. Reeves acknowledging that the conditions regarding a man in charge of the shipment should be done away with. The arrangement now puts the shipper to the inconvenience of writing to the local passenger agent and asking for the privilege of sending animals without a man in charge, and he has the right to grant or refuse; but with regard to Mr. White I may say he is very liberal.

Mr. J. C. Snell, of Snelgrove, then addressed the meeting: I feel that the time is precious, and that it is not necessary for us to go very much into detail when we are addressing a gentleman who is as practical as the Minister of Agriculture, and it is only necessary for us to state our opinions briefly. I shall speak briefly regarding the quarantine regulations, and ask that steps be taken to secure the relaxation of the quarantine regulations both in the United States and in England. It is only cattle that are inconvenienced. We have free admittance in sheep and hogs. I do not think we should be satisfied to accept the same regulation from the United States as we do for sheep and swine. We know that they have "hog cholera" in many parts of the United States, and I would stand for a short quarantine.

Mr. Richard Gibson: The United States has lately removed the quarantine as regards Mexico Now I think we might go to the United States and ask them to put us upon the same footing as they have put Mexico. They are now upon the eve of an election, and perhaps like in our recent election here, the party who are now in power may be "snowed under," so that we had better make haste, or when we ask to be put upon the same footing as Mexico, they may say we never removed the quarantine from Mexico, our predecessors did that. You know the trouble we have had about transportation. You have heard what J. J. Hill did,—he got free transportation to the fairs and also got thoroughbred bulls and turned them out on the prairie. I mention this as illustrating the interests that the railway corporations have in building up our herds.

Mr. Greig, Secretary of the Breeders' Association in Manitoba, being called upon by the Chairman, spoke as follows: I would only add this to what has been said about transportation. In our country the breeders are so very far apart that we undertook to approach the railways, and a number of leading men were appointed to wait upon the railway. We waited upon Mr. Kerr, of the C. P. R., which is about the only railway that we have to do business with, at about the same time that your representatives were urging closer rates here. We were asking for better rates than those that were granted you, but when these rates were accepted by the Ontario breeders we took them as well; so that the schedule of weights has been more satisfactorily arranged, and we get a rebate of 50 per cent. on pure-bred cattle when we produce certificates. Replying to a question, he said: The quarantine does not affect us in Manitoba. It does affect the western country. We bring all our cattle from Ontario. If the quarantine was taken off we might find it more convenient to purchase across the line.

Dr. Smith: We do not have pleuro-pneumonia in this country, and never had pleuro-pneumonia in the country, except in a few cases of importation where the cattle were killed and it was quickly stamped out. They had pleuro pneumonia in the United States, but the American authorities took active measures against it, and judging from the report of the experts and from conversation I believe that no pleuro-pneumonia exists in the United States to-day. Therefore, I think the quarantine regulations between Canada and the United States might be modified. I had a conversation with Dr. Salmon, and understood that he did not see any trouble in removing the quarantine. The only disease we have to quarantine against is pleuro-pneumonia The other disease, tuberculosis, is in the United States, England and everywhere. I believe we have less of it here than anywhere. (Hear, hear.) I believe that there are many things in connection with the tuberculosis test that require a certain amount of consideration. I am not going to speak of their injuriousness to the human being. That has been touched upon. We know that while it can be communicated from the animal to the human being, that the chances for its occurrence are very small. We know that glanders are communicable from the horse to man. But in every case where a disease can be so transferred, there seems to be a wise provision in nature that makes this disease, which can be communicated from the lower animals to the human being, of very rare transmission from the one to the other. And I am very glad to say that the communicability of tuberculosis to human beings from the animal is of very rare occurrence. In Germany they have magnificent slaughterhouses, and when they find an animal that is slightly affected it is killed and the meat cooked at a very high temperature and sold at a cheaper rate, there being no danger whatever from infection.

The Chairman: Is it necessary to have ninety days quarantine?

Dr. Smith: Regarding pleuro-pneumonia ninety days is none too long.

Dr. Mills, Principal of the Ontario Agricultural College at Guelph, being called upon, said: I must say that I consider this a very important meeting, and I am pleased to see so large a number of representative farmers here to-day, especially of stockraisers and the agricultural interests. I must say that, with you, Mr. Chairman, I congratulate our farmers upon the appointment of so thoroughly a practical farmer to the head of the Department of Agriculture. There is hope in the fact that Mr. Fisher is a practical farmer. We are glad also that Mr. Fisher is not only a farmer but a scholar. The

farmers appreciate learning. They choose men to represent them in the Government and elsewhere on account of their scholarly attainments. We are glad to be able to go to a practical man and to know that he is interested in the things that are occupying our attention to-day. Learning is all very well, but as the Chief Justice of England remarked, I think at Ottawa, that he was pleased to note our educational system, but were we making the education of a sufficiently practical bearing. We can raise as fine cattle in this country as anywhere, but I also agree with Col. McCrae that we should have a change of blood in order to keep up their standard. It seems to me to be a great grievance that the records of live stock in this country, which are admitted by all who know anything about them to be of the highest standard, should not be accepted across the border in the United States. There can be no reason for it, except possibly that some one may be interested in the American records. Regarding cold storage, to which the Minister has committed himself to do something, I want to call his attention to one other matter. I happen to be president of a fruit exporting association, of which Mr. Wolverton, who is present with us, is secretary. Last year we decided to send 115 barrels of apples to Australia by the C.P.R. These apples suffered greatly in transit for lack of cold storage. But such as were got through in a marketable condition commanded a satisfactory price, being sold at $3.30 per bushel, netting on all about $2 per bushel, when no such price could be obtained for them here. In making arrangements for a cold storage system, I would like the Hon. Mr. Fisher to bear in mind the interests of the fruit growers of the country as well as those of the stock raisers.

Hon. Mr. Dryden, Minister of Agriculture for Ontario, was greeted with applause as he was called upon by the Chairman, and made the following address: I am very much obliged to you, sir, and the other gentleman, for the kind words in reference to myself. I may say that if I have been able to add to the material wealth of the Province of Ontario, and to increase the prosperity of the farmers, I have simply been doing my duty, and I will continue to do so whether you praise me or not. I want to say to the Hon. Mr. Fisher that we are not playing at politics. These gentlemen here are of different sides in politics, but they are convened together here as business men dealing with matters of business. I know the feeling of the stockmen of this country; I know the feelings of the farmers as well, and they are almost unanimous that there ought to some revision as regards freight regulations. We are getting down to rock bottom in everything, and I feel that there should be no obstacles in our way if we are to keep up the standard of our herds. We must also have access to enlarged markets, we must find a man 50, 100 or 1,000 miles away who wants to buy. I do not speak of this for the benefit of the men who have these herds. It is because of the indirect benefit that comes to the Dominion as a whole that I feel strongly that we need this enlarged market. The majority of us feel that it is necessary if we are to keep up the high standard our herds have attained. I am not going to take the chance of losing $1,000 or so paid for a bull by having him slaughtered at the border because some one claims that he is not sound. I do not know that an animal coming from England is going to do any more harm than one that I get in this country, for we have the disease all round. Then, as to the records, it has been rightly said that we have as good records in this country as anywhere, but you cannot get a thoroughbred animal across the line unless you have it recorded in the United States. It is because some one has been in booming their own records on that side, and have been able to get the ear of the authorities in order to shut out Canadians and compel us to get our animals recorded there. This quarantine and this record business should be dealt with at the same time. These questions are intimately connected. Our dealings must be of advantage to both parties. We have in the present Minister a man who understands these questions, and I believe that we shall hear from his own lips that he intends dealing with these matters so as to secure the advantages sought and have the obstacles removed that are hindering our progress. (Applause.)

Hon. Sidney Fisher, Minister of Agriculture for the Dominion of Canada, being introduced by the chairman, was greeted by continued applause. In reply he said: I need not tell you how great a pleasure it gives me to come here at this time to meet the

men who are engaged in my own business—in farming. If our present Government has anything on which it can claim the support of the whole people, it is because it is a business Government. You have said some flattering things regarding myself, and the fact that being a farmer will cause more to be expected of me in the position I hold than of one who is not so closely identified with the work of this department. I have not the advantages of living in your Province. I am engaged in farming in the sister Province of Quebec. You have alluded to me as a practical farmer. I appreciate that as the highest compliment I could receive at your hands. Mr. Dryden, Minister of Agriculture in Ontario, has done a great work in raising the standard of farming throughout the Province. I appreciate very highly the standard thus set before me by a practical man, and understand fully the difficulties I will have to meet, as a great deal more will be expected from me because I am a practical farmer.

Now, gentlemen, I have taken notes of what has been laid before me. I have come here to-day not to give you information but to get information. I might easily have permitted my duties to have detained me in the House of Commons, but I felt that I could not miss such an opportunity to be with you. I am not prepared to give you any definite reply regarding these questions. While I am pleased to identify myself with the interests of the farmers and breeders, there are other interests and other sides of the question to be examined, for I must not forget that I am a member of a Government that deals with the whole people of Canada; and I do not think that the farmers would wish that I should do anything that is not for the good of the whole country. The same may be said regarding dealing with the health of the animals in the country as well as with the importation of animals from outside. The authority of the people of Canada as vested in the Dominion Government in many of its departments touches and overlaps the Provincial rights. This is particularly the case in my own Department, which comes into close contact with the Provincial departments, and I feel that I can come into contact with the Provincial departments and that we may work together for the interests of that great class which we are especially appointed to guard.

The question of quarantine is one of utmost importance to stockmen and to the country. It seems to have two important bearings. One with regard to the interchange of thoroughbred stock. The free interchange of thoroughbred stock would be a great advantage to both countries. Then our stock raisers wish to send their beef cattle into the United States, and want to ship their cattle through the United States to Great Britain when more advantageous than through our own ports. We must consult with the other interests that are concerned, and though I am the especial guardian of the farmers' rights and must press forward the interests of the farmer, still I must, as a member of the Government, speak to you regarding this matter in the light of an international question.

You speak of the excessive railroad rates on cattle. I can sympathize with you. Within the last few months I have had to miss the sale of several animals because the freight rates would have eaten up the profits. The railroad corporations are powerful in the country. Their interest at first sight may be in contradiction to our interests. I trust, I, as a member of the Cabinet, shall be able to show the railway companies that it is in their interest to reduce their rates on live stock. (Applause.) I trust that in the near future we may accomplish the satisfactory arrangement of freight rates by a carefully arranged schedule of rates that will do justice alike to the stockholder and the breeder.

The last question is that of tuberculosis. I have studied this question somewhat. I have seen animals slaughtered as being affected with tuberculosis. We should take due precaution against this disease, but I do say that the recent scare was unfounded and unnecessary. But in saying this, I do not desire to put the farmers off their guard against thoroughly stamping out the disease and disinfecting the barns where it occurs, so that we may confine the disease to certain individuals only.

Now, Mr. Chairman, I was very glad to hear the words of Mr. Dryden, when he stated that we were not playing at politics here. There are no politics entering into

these questions. They affect all alike. We have naturally our own political convictions, and when we are in an election, can air them ; but let us drop all party differences when we come to deal with questions that are going to advance the interests of farmers as a class. (Loud applause.)

JOINT EXECUTIVE MEETING.

A joint meeting of the Executive Committees of the Dominion Cattle, Sheep, and Swine Breeders' Associations was held in the Kerby House, Brantford, on the 21st of May, at one o'clock. Mr. John I. Hobson, President of the Dominion Cattle Breeders' Association, was elected chairman. There were present Messrs. John I. Hobson, J. C Snell, Arthur Johnston, David McCrae, Jas. Tolton, D. G. Hanmer, John Jackson, R. H. Harding, J. E. Brethour, Geo. Green, G. B. Hood and F. W. Hodson.

The following questions were presented by the Secretary for consideration :

1. Live Stock Trade with South America.
2. Transportation.
3. Publication of a Standard of Excellence.
4. Shall our Association publish monthly a Breeders' Directory ?
5. Shall we have a tent in the grounds of the Toronto Industrial this year ?
6. Shall we have envelopes and letter headings printed for the Directors ?

Live Stock Trade with South America.

Moved by Jas. Tolton, seconded by David McCrae, that Mr. Dryden be requested, with the assistance of the Secretary, to lay the matter of live stock trade with South America before Mr. E. E. Sheppard, with a view to furthering the interests of Canadian breeders. Carried.

Moved by D. G. Hanmer, seconded by R. H. Harding, that the Secretary be instructed to go to New York to get all the information he can towards live stock trade with South America, and that any extra expense be borne by our Associations. Carried.

It was also decided that the Secretary be instructed to write the railroad companies thanking them for the better facilities for shipping live stock to Manitoba and the Northwest.

Mr. G. W. Clemons complained that this year it would be necessary for him to pay $14.00 extra to ship his animals for exhibition at the Montreal fair.

The Secretary was instructed to do anything he could to assist Mr. Clemons in this matter.

Standard of Excellence.

The Secretary : Some time ago it was decided that the Director for each breed should prepare a short history, etc., of the breed represented by him, and report to the Association some time in the future. This has never been done. It is just as desirable to do this work to-day as it has ever been. It will be necessary next year to issue our regular annual report. If we were to prepare a standard of excellence and publish along with it a short history of each breed, I think it would make an excellent report, and it would cost no more than our reports have heretofore cost.

The reason the work has not been accomplished is because it was left to the breeder representing each breed. What I would suggest is that somebody be chosen to go carefully through all the English, American and Canadian works relating to this matter, and compile a short history and standard of excellence of each of the breeds. A good

practical man should be employed for this purpose. This would make a very useful volume ; it is one I have been asked for a good many times. Before publication, a copy would be sent to each breeder, together, with a letter requesting him to make such suggestions as he thinks advisable This matter would be the basis of the discussion at our next annual meeting.

It was moved by G. B. Hood, seconded by J. C. Snell, that the Secretary be authorized to go on with the work as he suggests, and get all the necessary data and books, and employ such assistance as he deems necessary. Carried unanimously.

Publishing Monthly Directory.

Moved by Jas. Tolton, seconded by G. B. Hood, that the Secretary be instructed to issue monthly a Breeders' Directory, as outlined in the report of the Secretary.

Moved in amendment by J. C. Snell, seconded by Geo. Green, that the Directory be published monthly without the animals for sale being mentioned. Original motion carried.

Tent at the Toronto Industrial Exhibition.

Moved by Arthur Johnston, seconded by Jas. Tolton, that we believe it to be in the interests of the live stock breeders that we have a tent on the grounds of the Toronto Industrial. Carried.

A letter was read by the Secretary from the secretary of the Brandon Fair Board asking for a donation towards the prize list of their fall fair.

Moved by David McCrae, seconded by Arthur Johnston, that we will take the matter into our serious consideration for next year, and the Secretary be instructed to write them accordingly. Carried.

Letter Headings and Printed Envelopes.

Moved by R. H. Harding ,seconded by Geo. Green, that we endorse the system of advertising by having letter headings and envelopes printed for each director of our Association. Carried.

PUBLIC MEETING.

The open meeting held in the City Hall, Guelph, on Dec. 8th, 1896, was very argely attended by representatives of the various stock associations, exhibitors, and the citizens of Guelph, including a number of ladies. The hall was decorated with bunting and flags, and presented a bright and attractive appearance. Hon. John Dryden, Minister of Agriculture for Ontario occupied the chair.

Chairman's Address.

Hon. Mr. Dryden, in opening the meeting, spoke as follows : I congratulate the Association under whose auspices we are gathered on the very large number of representative stock men I see here. It is certainly very gratifying to think that so many of these gentlemen should come to these gatherings and come from very long distances. It is an indication of the unity and enthusiasm which is found among them and it is a good deal to say, in these days that stock breeders are enthusiastic, because we are passing through days of depression in this industry.

I also congratulate the members of the Live Stock Associations on the report they have given to my Department, and which we are now circulating broad-cast over the land. It contains a large fund of valuable information, and cannot do otherwise than give to

our farmers all over the country pointers as to what they ought to do in reference to this particular business which should be of very great advantage to them. I want to say that no report published by my Department is more eagerly sought for than this. I am aware that the work in which you are engaged in this regard—scattering information all over the country—is entirely unselfish, but it is work that is very interesting and attractive after all, for, as years go by, and you see the advances that have been made, it will give you a great deal of satisfaction to know that you had something to do with it.

I want, too, to congratulate the citizens of Guelph on the interest they take in these gatherings. I have always had a liking for the people of Guelph, ever since years ago I came here as one of a deputation to find a site for the Agricultural College. Since then I have been here over and over again, and have always found the city ready with its hospitality to whoever came. There is only one thing they refuse to do—I suppose their their sense of propriety will not allow it—and that is to look upon beef, mutton or pork as it is walking about alive. They refuse to go to the Fat Stock Show, but they do so many things that are nice, that we can readily forgive them for that. I have not yet seen the show, as I arrived in town only a few minutes ago, but I hear it is an exceedingly good one. Will the ladies and gentlemen here allow me to extend to them a hearty invitation to go and see it. It is worth your while, for you will see what you will not have the opportunity of seeing in any other single show in this country. I hope you will accept the invitation, and that I shall learn that the attendance this year has been greater than ever before. I will now introduce to you Mayor Lamprey who I know is most anxious to bid you welcome.

Welcome from the Mayor.

Mayor Lamprey: On behalf of the citizens of the Royal City of Guelph I have much pleasure in extending a very hearty welcome to our distinguished visitors comprising the Honorable Ministers of Agriculture of the Dominion and likewise of this Province, and also to the numerous other gentlemen representing the Dominion Cattle, Sheep and Swine Breeders' Associations, the Guelph Fat Stock Club and also the Dairymen's Association.

I need not say that the meeting of the Associations referred to have heretofore been fraught with much profit and beneficial results in educating the farming community. This is shewn by the wonderful improvement manifested in stock breeding in this county and the province at large during the past number of years, chiefly owing to your successful annual gatherings in connection with your respective Associations, and also through the intermingling and exchange of sentiment on the various topics of interest coming under your consideration relative to stock raising.

I have to thank the directors of your several Associations for continuously holding your respective exhibitions in this city.

I would further say that there appears to be a prospect in the near future of holding your several exhibitions in other cities, judging from the opinion expressed at a meeting held last summer at the Ontario Agricultural College, having previously arrived at the conclusion that they would be permanently located at Guelph for all time to come, when suitable buildings might have been constructed by the city for that purpose, and for which I have always contended that our claim for the same is based on the following facts, viz:

First. That Guelph is located in one of the most central counties in Ontario, being in close proximity to the Ontario Agricultural College, and in one of the best stock raising districts in the Province, favorably known as the "Smithfield of Canada"; and besides, possessing such convenient and ample accommodations for exhibition purposes in our large and commodious skating rink buildings, which our city council has so generously provided free of charge for the several associations.

Second. That Guelph had the honor of establishing the first Fat Stock Club exhi-

bition in this Province, which exhibition has annually increased during the last fifteen years to such vast dimensions to the entire satisfaction of this and sister Provinces.

I hope the directors of the several associations will consider the matter, and decide to continue holding their exhibitions as heretofore in our midst. However, I presume that we should not be too selfish, and gracefully submit to the decision of your directors and endeavor to carry out the golden rule. Should you conclude to establish the perambulating system with your exhibitions, when our turn comes around, I feel assured that the citizens of Guelph will with pleasure afford all those connected with your several associations who may honor us with their presence, a most hospitable reception.

I tender you again a most cordial welcome, and hope that you will spend a very profitable and enjoyable time in this city on this auspicious occasion. (Applause.)

Address by President Mills.

In replying to the civic address, Dr. Jas. Mills, President of the Ontario Agricultural College, said : I esteem it an honor to have a place on this platform to-night, and to you, Mr. Mayor, permit me to say that the different associations which I have the honor to represent, value very highly the cordial welcome you have so well expressed for the city you represent. On behalf of the farmers and stockmen of this Province, I thank you for it.

This is one of the occasions on which city and country people have an opportunity of uniting to their common welfare and interest. City people have special opportunities for obtaining information and possess many advantages which result from constant social intercourse. This none will deny. But dwellers in the country have certain advantages too—health and independence, leisure at certain seasons, the quiet beauty of country scenes and freedom from the struggle, temptations and risks of the city, all go to make life on the farm a source of real pleasure to many.

Regarding the importance of the farmer's vocation, I think there can be no question. "Let us never forget," said Benjamin Franklin, "that the cultivation of the earth is the most important calling of man. Without the cultivation of the earth, man is in every country a savage and roaming barbarian ; when tillage begins, other trades follow. The farmers therefore are the founders of civilization."

I might dwell on the difference between the town and the city, but I wish to impress upon you the importance of co operation between you. Neither can succeed without the other, and all those things which tend to bring these classes closer together are a real benefit to the country.

Guelph has done a great deal towards the success of the Fat Stock Show. I have been pleased to notice the enterprise of the corporation, and I have often wondered at the liberality with which the Guelph merchants and others have subscribed from year to year. I want to say to the people of Guelph, and especially those who have contributed from year to year, that the farmers and stockmen appreciate their liberality.

The Fat Stock Show held here, one of the best on the continent, is a great benefit to many ; directly to the exhibitors, the city of Guelph, and the farmers of this locality, and indirectly to all who read the press reports thereon.

A great deal depends on kind treatment in successfully feeding animals, and the type has a great deal to do with the result. Blood will tell with the lower animals as well as with the human family. If we could bring the average farmer here and let them see clearly what can be done by skillful feeding and good breeding, there would be hides for sale all over the Province.

In the production, therefore, of the animals on exhibition at this Show, your citizens will find abundant evidence of intelligence as great and important as that which enables a man to manage a bank or lead a political party. I cannot understand why the people of Guelph should not visit this show. The best bred and most highly cultivated ladies

in England go to such shows, and Her Gracious Majesty herself is an exhibitor at the chief shows in Great Britain. I think it would be well for the people of this Province to bear in mind what Lord Playfair said the other day, namely, "Competition in industry is no longer a question of local advantage and practical aptitudes, but is fast resolving itself into a question of trained intellect and superior intelligence."

I am glad that the farmers of this Province, or an increasing number of them, are awakening to the importance of the great industry they represent. They are beginning to see and understand that it is not the hardness of a man's hand but the quality of his thought that determines his fortune. Hence we have at the Agricultural College a larger attendance and a larger proportion of farmers' sons than at any time in the past. Every room in the College is filled, and some are boarding outside.

I think I may say that, notwithstanding the discouragements in farming, in some senses the prospects are brightening from year to year. Allow me to thank you for the hearty welcome and good will you have extended to us on behalf of the citizens of Guelph, and to express the hope that this may be the best and most successful dairy and fat stock show ever held in the Dominion of Canada. (Applause.)

Mr. Hobson's Speech.

In response to the address of welcome, Mr. John I. Hobson, of Guelph, said:

It is very pleasing to us who have had a great deal to do with the getting up and management of this show, and in preparing the programme for this evening's proceedings to see such a splendid turn-out at this meeting. We are pleased for many reasons; the first is that it shows there is a change coming over the people. A few years ago it would have been a difficult matter to get together any considerable number of people to take part in a meeting gotten up under the auspices of an agricultural association. I think it is a good omen for the future. Then we are especially pleased to see such a splendid turn out doing honor to our Dominion Minister of Agriculture, and our Minister of Agriculture from Ontario. (Applause.)

I think I am correct in saying that this is the first time Guelph has ever been honored by having a Dominion Minister of Agriculture present at any gathering, and you will agree with me when I say that we have much reason to thank him for coming here, as it is not an easy matter for him, owing to the great amount of business he has to transact and the many calls upon his time.

Dr. Mills has already referred to what this city has done towards aiding in getting up our Fat Stock Show. As chairman of the exhibition committee, and as a director of the Fat Stock Club, I take this opportunity of publicly thanking the Mayor and Aldermen of this city, who in their representative capacity aided us so willingly and courteously that we think it only right and proper that we should publicly acknowledge their assistance. I desire to refer, also, to what the citizens have done, and I should like to impress and endorse what has been said in this connection.

The people of this city seem to realize that this show is of Provincial and Dominion as well as of local importance. It is not necessary to dilate on its advantages to agriculture generally. We can readily conceive that if the great body of the farmers of this country could have attended these sessions from year to year, it is not too much to say that they would have deposited at the doors of this show building many a prejudice. They would have gone home convinced in their minds that the systems they and their fellows had adopted, were not in accordance with the progressive agriculture of to day. They would have realized, as they never realized before, the value of science when brought to bear on the practice of this department of farm operations; that the men who have brought the animals which are to be seen here to such a splendid state of perfection, are men who have a thorough knowledge of the science of stock feeding, that it was not mere chance. It matters not in what way they acquired that knowledge, it is patent they are scientific agriculturists in the truest sense of the word.

Speaking of the advantages that come from this show, it may be said to have a marked effect in a way that is perhaps not always realized : it has a tendency to interest wealthy men who are not engaged in this line of business. There is a tendency among the wealthy men of the United States to take their recreation in that way, and in so doing they are following up an industry which, while of great interest in itself, is a benefit to the country as well. We know what the wealthy men of Great Britain have done and are doing to advance agricultural interests. It is not beneath any man there to take an interest in agriculture, and the ladies of that country, as has been said by Dr. Mills, are to be seen by scores and hundreds attending such exhibitions. I saw only in this morning's paper that at the Smithfield Show, the Queen, Baron Rothchild and Lord Roseberry were prize winners.

Perhaps one of the most important features of a show of this kind is that it brings farmers and men of other occupations into touch. Whether a man works by brain or by hand, there is a unity and close connection of interests which cannot be disassociated ; they are bound together by a bond of common interest. Trade, commerce and manufactures cannot flourish without shedding a kindly influence on agriculture, and we know that agriculture cannot decline without involving trade and commerce in its decay. It is a matter of sincere gratification that we find the people of other callings joining with us in advancing the great interests of our land. (Applause.)

I should like to speak of the future of this Show. I do not want to take an undue advantage of any other place, but I understand there is an effort to be made to take it elsewhere, and that a vote will be taken on the question. I want to say that the stock men should consider carefully before giving up a certainty for an uncertainty. We know that this city has had its fat stock show for perhaps nearly a quarter of a century. Then it is a centre from which is annually distributed about a million dollars' worth of stock, which is thus spread all over the Dominion. It has taken us years to work up our arrangements and make them as satisfactory as they are now admitted to be. We have many advantages here, and I trust and hope that this may yet be made a permanent institution, and that we shall have the honor of seeing this city the Smithfield of Canada. (Applause.)

Address of Mr. J. C. Snell, Snelgrove.

Any remarks I may make on this occasion must be mainly in the nature of congratulations to the officers and members of the various associations interested in the management of the magnificent exhibition of live stock now being held in this city—an exhibition of which the people of any country might well be proud. It may well be said that it speaks volumes for the enterprise, intelligence and skill of the farmers of this Province that they can make such a grand display of their work as we have seen in Victoria Rink to-day. I think it may as well be conceded without debate that in Ontario the sheet anchor of successful farming is the raising of high class live stock.

We cannot reasonably expect to successfully compete with our own Northwest, nor with some other countries, in the cheap production of grain, but we can, as we have done in some measure, make Ontario the nursery for high class pure-bred stock, and we may place ourselves in a position to supply the demand for improved stock which must inevitably follow the more complete settlement of the Northwest, as well as the demand which may come to us from foreign countries. Our aim should be to produce the best in all lines of live stock and live stock products, and thus be prepared to meet the demand for these which, sooner or later, is bound to come our way.

The objects of these associations, and of these exhibitions, is to improve the quality and character of our stock, and to incite our farmers to the ambition to maintain a high standard of excellence.

I am fully persuaded that this annual winter show of stock is doing more thorough work in this direction than any other of the efforts that are being made on similar lines. Here we have a purely agricultural exhibition, minus the attractions and distractions

which characterize the autumn shows, and here we have time and opportunity to carefully study the characteristics and types of animals in competition.

As a school for the education and training of judges of stock, I am sure it has no equal in any of the organizations of this kind, nor has it an equal as a meeting place for farmers and breeders for comparison of notes and results, as well as for friendly social intercourse. This annual "round up" of the stock men of the country should be cherished by them as one of the best institutions we have.

As a farmer, I want to say that I believe I voice the sentiments of all the farmers present in saying we are glad of this opportunity in meeting the Honorable Ministers of Agriculture for the Dominion and the Province on the same platform at a convention of agriculturists. We know that they are both deeply interested in our work, and in thorough sympathy with our common interests, and willing to do all they can legitimately to advance our interests. And I want to say here now that the farmers of this country entertain not only great respect for, but also great expectations, of our Ministers of Agriculture. While we are prepared to do our part in helping ourselves, we submit that agriculture is a clearly paramount interest and industry of this Dominion, that upon it the prospects of nearly all other industries depend, and while we have no desire to become the wards of any government, we do want at least equal rights with other classes of the business community, a fair field for the disposal of our products to the best advantage, the means of placing them with the greatest despatch, in the best condition, and at least cost, upon the markets of the world. (Applause.) Given these conditions, in the attainment of which we think we have a right to expect the practical assistance of a Government which claims to be a business Government, the farmers of this country have the courage, the enterprise and the skill to compete successfully with those of any other country on the face of the earth. (Applause.)

Hon. Mr. Dryden: I can scarcely hope to make my audience understand with what pleasure I shall introduce the next speaker. For the five or six years during which I have labored as head of the Department of Agriculture for this Province, I have felt at times as though I were acting very much alone and unaided, and that I was expected perhaps to do more than one single man could accomplish for the benefit of agriculture. I have been at various places in this Province, attended meetings of this kind, but never before have I had the pleasure of standing upon the same platform with another Minister of Agriculture. But at last the farmers of this country have had their way; have determined that one of themselves shall be placed at the head of agricultural affairs, not only in the Province, but in the Dominion, and now we have with us for the first time in connection with a meeting of this kind in the history of Ontario a Minister of Agriculture for the Dominion who is himself a farmer. (Loud applause.)

What has been said in reference to this has only, I am sure, voiced the sentiments of everyone here present. I do not take the ground that no one but a farmer can represent farmers, but all things being equal, I do say that one connected with this industry is more likely to know what the industry needs in a position of this kind. It gives me very great pleasure to introduce Hon. Mr. Fisher.

Address of Hon. Sidney Fisher, Dominion Minister of Agriculture.

Mr. Fisher on coming forward was received with enthusiastic applause. He spoke as follows: The task placed upon my shoulders this evening is perhaps rendered a little more heavy in consequence of the kindly words with which Mr. Dryden has introduced me. Our friend, Mr. Snell, a few minutes ago said that great expectations were raised among the farmers and the people of this country because you had here to-night two Ministers of Agriculture. I have felt ever since I have had the honor of occupying my present position that the farmers of this country were raising their hopes too high as to what I as a farmer might be able to accomplish in that position. It is true that for the first time, a man engaged in the business of farming has been chosen to the position of Minister of Agriculture for the Dominion, and I find that the expectations of the people

in consequence have been greatly aroused. I feel still more therefore the responsibility that rests upon my shoulders in the work I have to do, but I may say that I shall be inspired, as I have been already, by the success which has attended my colleague the Minister of Agriculture for the Province of Ontario. (Applause.)

As a farmer of the Province of Quebec, I have for years back envied you, the farmers of Ontario, the fact that you had at the head of the Department of Agriculture, not only a highly cultivated and well informed man, but one who was a practical farmer and thoroughly understands the business in which he and you are engaged. I trust I may be able to follow in his footsteps and do something in the interest of the farmers of this country. (Applause.)

I have looked forward for a long time to taking part in this, what may be called, week of farmers' meetings. The name of Guelph had come naturally to suggest agriculture to me, because for so long it has been the seat of the great Agricultural College, and I have frequently heard also of the meetings of the stockmen which take place at the time of the Fat Stock Show. I had tried over and over again to take part in them at a time when I little thought that the first time I should do so would be in my official capacity as Minister of Agriculture.

I trust it is a happy augury that I am the first Dominion Minister of Agriculture to be among you here at these meetings. I confess it is an announcement which astonishes me, because it seems to me it is the first duty of a Minister of Agriculture to meet face to face the farmers of the country : to find out what they need and how they may be aided. I could not believe that there was any better occasion for meeting face to face the leading agriculturists of this great agricultural province. I know that I shall reap great advantage for myself ; that I shall meet men whose names have been familiar to me—familiar from reading of their successes or from reading the agricultural journals to which they have contributed—so that, although many of the faces are unknown to me, many of the names are familiar.

Guelph has always been asociated in my mind with the Ontario Agricultural College, which you are so fortunate to possess. That institution is one which the whole country envies you, because it has been such a success. I can remember when I first began farming a little while before your college was established. I had had a fairly good education, but, unfortunately, although I always intended to be a farmer during the time I was a young lad and growing up, it was the fashion to believe that so long as a man owned a farm he was a farmer. That was my own idea. I had no idea I was wasting my opportunities at school and college in not studying the business I proposed to enter into. But had I looked for these opportunities here in Ontario, I fear I should not have found them, because at that time there was no agricultural college in the whole Dominion. Things have changed since then, and now we have not only this institution of learning at Guelph, but we have going out from it continually, in waves or ripples as it were, the effect and influence of the scientific training of the men who take its course of instruction, an influence which is having its effect, not only in Ontario, but upon the agriculture of the whole Dominion.

Times have changed in the last twenty years in agriculture in our country, as they have in agriculture all over this continent, and I might say the world. To day the old idea that farming is all drudgery, and that one must work by rule of thumb, is passing away. To-day the people who have studied farming know, and take pleasure in telling those who do not know, that in agriculture there is scope for intellectual development as there is for muscular and manual training. They know, and are telling the people of this country, that if a young man is ambitious and wants abundant opportunities in the exercise of his mental qualities, he may find such opportunities in agriculture. The result is that agriculture as a business is assuming its proper place in the forefront of the industries of the country.

Your Agricultural College I am sure, has been of great value to the people of this city, and must have had its influence even on those not engaged in agriculture. I have always found that wherever there is an institution of learning, it elevates and improves the

people in whose midst it is. The presence of its staff of intellectually trained men must be of advantage. The fact that, in consequence of its presence here, men come from all over the country, and I may say from all over the world, to visit this institution, is of importance to you, because it renders your neighborhood known : and not only that but it brings you such gatherings as this.

I understand that the Guelph Fat Stock Show took place and was in existence before the Agricultural College, but I am sure the presence of the College has helped the Show, and I am sure the number who come to such gatherings as this is largely increased, and that a great deal more pleasure is derived from the meetings on account of having the College here.

It is only a few weeks ago at Ottawa that I met a gentleman from Jamaica who had come up here chiefly because he wanted to visit the College. He was engaged there in agricultural matters and was sent here by the Jamaica Government especially to study how he might initiate and improve a course of agricultural study on that island. He had visited several of the American Colleges, but was frank enough to tell me that he was more than pleased with the Guelph Agricultural College, and found he could get the best example of what he wished at Guelph.

I am especially pleased to come to a gathering where I meet the stockmen of the Province of Ontario. Being a farmer myself I appreciate perhaps as well as anybody the value of stock to our farmers. Those engaged in the business know full well that there is no means by which a farm may be so well maintained in its full fertility as by the keeping of stock. We know, too, that in the keeping of stock and in the development and working up of the product of these animals there is the highest development of agriculture. In this the greatest skill is shown ; in this the greatest study and science is brought to bear, and it is by the stockmen of the country especially that agriculture can be advanced to its highest stage. Ontario is celebrated the world over to-day for her agriculture, and I believe it is her stockmen and her stock which has made her reputation more than anything else. We know perfectly well that at the great Chicago Exposition the stockmen of Ontario took an unduly large proportion of the prizes. The people to the south of us, rich and great and prosperous as they are, are obliged to come to Ontario for their stock. They would be glad to come and buy if it were not for the impediments to trade. At the time these impediments did not exist there was a large trade in pure bred stock, and it is proof of the fact that the stockmen of Ontario have showed their preeminence in this great science.

The fact has been mentioned that prominent men in the old land, not engaged in farming as a business, have taken prizes at the various exhibitions. All honor to them. I am glad to know that in our own country, too, there are certain rich people, not farmers, who take an interest in these things. But when I come to the practical working, I want to come face to face with such men as I see before me ; men who by their efforts and skill have placed Ontario in the position she occupies in this regard,—not simply by money, but by individual effort, by hard study and practical experience in the field and barn have shown what they could do. I myself am a dairyman. I do not know that in these gatherings remarks on dairying are allowed.

Chairman : " Oh, yes !"

Mr. Fisher : Well, I came here only this evening and am ignorant, but after all stock raising and dairying are closely allied, and one without the other could hardly exist. I have always believed that this was the highest development of agriculture. When a farmer takes his crude crops, his hay and his grain, and sells them off his farm, he is after all merely performing the laborious part of the work of farming ; he is doing a crude work in comparison with the man who takes the products of the land and works them up into a higher class of products, in the shape of mutton, beef or pork, or butter, cheese and milk. It isin the production of these commodities that the greatest skill and science is shown, and when a man is able to sell his science and his skill, he is none the worse off for what has gone away from him ; he has obtained the advan'age and the price, and is

himself the better off for the fact that he has exercised his brain in the production of these things. The man who sells the coarse products of his farm is selling the fertility of the soil, and comparatively a small amount of intelligence and skill. The further he can carry this manufacturing process the better off he will be, until at last the highest point is reached, when he sells the smallest possible amount of those elements which enter into the fertility of the soil, and the largest possible amount of skill and industry put into them. This is a point that our young people ought to think upon and dwell upon, and which their teachers should impress upon them.

It is not for me to detain you long here. I have come here on a business trip. Allusion has been made to the Government of which I am a part, being a business government. I think we may interpret the fact that Hon. Mr. Laurier, our leader (cheers) has chosen a farmer for Minister of Agriculture, not merely as a compliment to myself, but as an evidence of his appreciation of the future and importance of agriculture in this country, and therefore of his business capacity; and I may tell you frankly, gentlemen, that if to day I am Minister of Agriculture it is because I am a farmer. (Applause.) This I take to be a practical compliment to the class to which I belong, because I think, if you will allow me to say it, that a man who is interested and engaged in the business is best able to understand its needs and to do that which is necessary to encourage it.

For some years back agriculture, along with other industries, has been in a somewhat depressed condition. This the Government fully recognizes, and our leader has authorized me to use my abilities to the utmost in endeavoring to work out a policy which will tend to the interests of the industry with which I am charged. I propose to work to the utmost of my power, and in anything I may do in this regard, I shall have the endorsation of my colleagues. (Applause.)

Address by Mr. Andrew Pattullo, Woodstock.

I am totally unprepared to address this meeting to-night, as I did not expect to be called upon. I should like to say a word of regret that Mrs. Hoodless, of Hamilton, owing to family bereavement, is not here as arranged. With all due deference to the able speakers you have heard, I can say for her that you would have listened to her remarks with as much interest as any. I had the pleasure of presiding the other evening at a magnificent meeting which she addressed in Woodstock. She treated her subject in a most interesting and entertaining way. I am not going to attempt to give you an idea of the nature of the address, but would advise you to have her speak in this city at the very first opportunity. The subject she is discussing, and with which her name has been connected for some time, is one of vital interest to this country. The central idea is that she believes the young women of this country should be taught household duties in an accurate, careful way, and that this is perfectly consistent with giving them all the accomplishments of the present day. This is a subject on which you will agree a great deal might be said, and the same idea applies also to the education of young men.

Hon. Mr. Fisher made one remark I was quite struck with. Some of you may know that not only is he a farmer but a college bred man too; but he has confessed to you to-night that a great deal of the education he got has been practically useless. A great deal of the education which some of our young men receive at the present day is to some extent useless; that is, it is useless considering the object to which they are looking forward. One of the defects of the education of some of them is that it rather takes them away from the farm and productive pursuits to enter the professions. I have no time to enlarge upon that idea. Mr. Fisher recognizes this fact when he says that he might have had a much better training for his particular calling and at the same time have received the same mental benefit.

I am sure you will forgive me if I make a reference to the historical incident which this meeting presents, namely, the presence on this platform of two Ministers of Agriculture, both practical farmers. Of Mr. Dryden it is not necessary to speak. Although he is a modest man, I will risk saying this: I know that he, like all worthy men, does not

care for flattery or even just praise in his presence. Sometimes we can better say things behind a man's back than before his face. But I think you will all agree with a statement made to me by a prominent farmer whom I see on this platform to night, when he expressed it as his opinion that Mr. Dryden had really added millions to the agricultural production of this country by the management of his department in the Province. He is the last man who would assume to have done it, but I think he has, by directing organized effort, by helping agricultural organizations, by creating new ones, and in supplying practical ideas in reference thereto. That is his work, and it is a mission that might be the object of the highest ambition of any man no matter how able or how prominent.—(Applause)

We also expect great things from Mr. Fisher. I have known him for many years as a most able and worthy man. I congratulate Mr. Fisher on the fact that although we have had dark days in this country, and a good many in connection with agriculture, concurrently with his accession to the office he holds things are beginning to look a little better. Of course Mr. Fisher has nothing to do with that, but I mention it as a piece of good fortune on his part. The price of wheat is higher than last year, and the price of cheese is going up. I believe the prospects of the farmers are brightening. I want to encourage the farmers not to give up agriculture—to encourage the young men of the country. It should be a stimules to Mr. Fisher to know that results will follow honest work, as they have done in the case of Mr. Dryden.

I should like to say in the presence of Mr. Fisher, and I am sure I voice the opinion of the farmers, that one of the problems he will have to solve is the problem of transportation in connection with agriculture. I am very glad he is going about that problem in a business-like way. I hope to see before very long the transportation rates of this country, as they affect agricultural products, regulated by the Government of this country to a much larger extent than at present. It would be very greatly in the interest of the farmers. In connection with cold storage, the efforts he has already put forth promise a great deal. I am sure the farmers will strengthen his hands in this matter. In this and in many other directions he is taking hold of the affairs of the department in a sagacious business-like way.

Mr Hobson hinted that there existed some fear that this magnificent Fat Stock Show was to be taken away from Guelph. It would be almost presumptious for me, coming from another town to say anything on the subject. We are not here for the purpose of stealing it (laughter), but if you should decide that for educative reasons the Show should go some place else, I could tell you strictly in confidence that I know of a town which would be willing to accept it at your hands. I am not sure either that we do not owe the people of Guelph something in this way. A year or so ago we decided on having a great dairymen's convention in Woodstock. I was head of the Association at that time, and in my innocence I supposed the members would say that Woodstock was the only place where such a convention should be held. Judge of my surprise when at the vote Guelph nearly took it away from us. Now if some of us turned round and endeavored to steal this magnifioent show, would you blame us very much?

Although we do not compare with you as the centre of a stock raising industry, I believe Woodstock is about the only place in Ontario, outside of Guelph, that has a thoroughly organized and effective Fat Stock Club. We are going to have a splendid fat stock show this year, so that if you are tired of this show, and want to locate it elsewhere, I can promise you an extremely warm welcome.

The chairman made a personal allusion to myself which I take as a tribute to that branch of agriculture in which I take a special personal interest, and have done for several years. During the present year, it is a significant fact that both the President and the ex-President of the Dairymen's Association of Western Ontario have been made members of parliament. Not being both on the same side of politics, one is an antidote of the other. (Laughter.) This may be taken as an omen of the popularity of agriculture in the Province to-day. (Applause.)

THE RELATIVE FOOD COST OF BEEF AND BUTTER.

By C. E. Thorne, Director of the Ohio Agricultural Experiment Station.

My earlier years were spent on the border of a region in south-western Ohio, in which Kentucky blue grass has reached almost as perfect a development as in its celebrated Kentucky home. On one side stretched great savannahs, set in this grass and divided into large stock farms, while on the other the farms were smaller and were devoted chiefly to grain growing and dairying. As was to be expected, the question upon which I have undertaken to speak to-night was one of great interest in this region, and when I assumed charge of our State Experiment Station one of the first requests made of me was for a line of investigation which should throw some light upon it, and the observations which I shall offer here to-night will be based upon the researches of our own and other experiment stations in this direction.

At the outset I must say that we are as yet only at the threshold of the great problem of animal nutrition; but a few facts have been established, which, while leaving much yet to be desired, are yet a considerable advance upon the complete lack of exact knowledge upon this point hitherto, and which offer suggestions for the accumulation of data from which a more perfect system of feeding may be elaborated hereafter.

The first difficulty encountered in a study of this character is the very great range of productive capacity in different animals. Farmers are familiar with the fact that no two animals will yield exactly the same produce on the same quantity of food, and know in a general way, that one animal may yield a very much larger percentage of profit than another; but I doubt whether the full significance of this natural difference in productiveness is generally recognized This difficulty can only be overcome by putting a large number of animals under observation; and the larger the number of animals, the longer the duration of the tests, and the broader the territory represented in the tests, the greater the value which we may place upon the results of these observations.

Our next serious difficulty is to find some standard with which we may compare the foods consumed by our cattle. It is evident, for instance, that straw cannot be compared directly with cornmeal, nor dry fodders with such watery materials as fresh grass, roots or silage. Fortunately, however, modern chemistry comes to our aid here, and gives us a basis upon which very fair comparisons may be made, due regard being had to the general character of the food.

The first step in the chemical analysis of a food material is the determination of its dry matter, and this is accomplished by drying it at about the temperature of boiling water until it no longer loses in weight. Under this operation we find that most of the dry feeding stuffs in common use lose from about eight to fifteen per cent. of their original weight, while corn silage shrinks seventy to eighty per cent. and roots eighty-five to ninety per cent.

The dry matter of a feeding stuff determined, the next point which affects its relative value is the proportion of protein, fat and carbohydrates or starchy matter it contains. Protein is that part of the food which contains nitrogen, and is the most costly and valuable constituent. Fat comes next in value, then the starchy matters and lastly the crude fibre, or woody tissue.

For the purpose of our present enquiry it is not necessary that we enter at length into the discussion of the relative value of these different constituents of the food, further than to note that it is essential that they approximately balance each other in the rations of the different animals under comparison. In other words, we must not compare the animal whose food is chiefly straw with one whose ration contains a liberal allowance of grain of some sort. But given two herds of cattle, fed on rations approximately equivalent in their nutritive constituents, and receiving similar treatment as to shelter, etc., and we may hope to get results which will bear comparison; and when we can multiply these herds until we have had hundreds and thousands of animals under

observation we may hope to discover some of the mysterious laws which govern the play of the vital forces.

A third difficulty which has until quite recently been a serious obstacle in the way of such investigations as that we are now considering is, that of determining the exact value of milk; for no farmer needs to be told that there is milk and milk. But the determination of the relative values of different milks by means of the churn is a tedious and costly process, and withal by no means an accurate one; for, however neatly and carefully the churn and its tributary utensils be manipulated, there will always be losses due to incomplete separation of butter, and to cream and butter sticking to the utensils, which will seriously affect the results. Thanks to the American experiment station movement, however, this difficulty has been completely removed by the Babcock milk test, one of the most valuable results of that movement, and one which would fully justify all the cost up to date of all the experiment stations in America.

By means of this test, the fat in a sample of milk may be quickly, cheaply and accurately determined, it being possible for one man to make hundreds of such determinations daily. The Babcock machine is as great an advance over the churn for milk testing as the self-binder is over the sickle for wheat harvesting. But this machine has only come into general use within the past two or three years, so that we are now only on the threshold of the knowledge which it will reveal to us.

Food Cost of Butter-fat.

During the winters of 1891 and 1892, from the latter part of January or fore part of February to the middle of April in each case, two lots of cows were put under observation by our station for the purpose, chiefly, of getting some light upon the relative values of corn silage and field beets as foods for milk production. There were sixteen cows in the test of 1891, and fifteen in that of 1892, half the cows being registered Jerseys and half the common grades of the neighborhood, chiefly of shorthorn blood.

The food given the cows was carefully weighed, and consisted of an average ration of six pounds of meal, either cornmeal or bran and oil meal, half and half, with either thirty pounds of silage or fifty pounds of beets, and all the good hay they would eat, the silage and beets being fed in alternating periods of three weeks each. The cows were fed twice each day, with a small feed of silage or roots at noon. Each cow was weighed at about ten o'clock each morning, then she was allowed to drink from a tub of water standing on scales, by which means the water drank was determined, after which, on fine days, she was allowed to run in the barnyard until one o'clock, when she was returned to the stable. The milking was done by the same men and in the same order, and the milk of each cow was weighed at each milking. In 1881 the percentage of fat in the milk was estimated on the basis of a gravimetric analysis made near the close of the test; but in 1892 the fat was determined by the Babcock test once each week, and the percentage of dry matter in each kind of food was determined, as well as that of protein and fat.

As the result of these experiments we found that the cows consumed an average of 24.68 pounds of dry matter each per day, and that from each 100 pounds of dry matter consumed, they produced sixty-nine pounds of milk and 3.20 pounds of butter fat. Ordinary butter contains about eighty per cent. butter fat, the remainder being water, and as they were approximately four days in consuming the 100 pounds of dry matter the butter production averaged nearly one pound per cow per day.

At the Agricultural Experiment Station of the University of Wisconsin sixteen cows, chiefly grade Jerseys, were fed through a similar test during the winter of 1892. The object of this experiment was to learn whether it is better to silo the entire corn plant, grain and all, according to common custom, or to silo the stalks only and feed the grain separately. The cows received five pound each per day of a mixture of ground oats and shorts, with four pounds of hay and all the silage they would eat. They were weighed daily and in other respects the conduct of the experiment was very similar to

ours. The result was a consumption of 24.61 pounds of dry matter per cow per day, and a product of 69 pounds of milk and 3.22 pounds of butter-fat per hundred pounds of dry matter in the food, results almost identical with ours. The experiment was conducted by Prof. F. W. Woll.[1]

At the Pennsylvania Station an experiment was made by Prof. Thos. F. Hunt in 1891 with twelve cows, including two registered Guernseys, four high grade Guernseys, two high grade Jerseys, two grade Ayrshires and two grade Shorthorns, eight of the twelve being heifers and all having calved within an average of about four months from the middle of the experiment. The cows were fed from April 13th to June 28th, in alternating periods, in which a mixture of corn meal and bran was contrasted with a mixture of corn meal and cotton seed meal, the meal ration being ten pounds per day per cow. The coarse feed was hay, corn stover, silage and green rye, and green timothy and clover towards the latter part of the test. The average live weight of the cows was about 900 pounds, their average daily consumption of dry matter was 22.57 pounds per cow, and the product of milk and butter-fat per hundred pounds of dry matter in the food was 78 pounds and 3.23 pounds respectively.

Eight of these cows were fed through a second test, lasting from June 15th to August 23rd, the meal food being corn meal and bran, ten pounds per head per day, with hay and green fodder. The cows consumed 22.61 pounds of dry matter per day and produced 79 pounds of milk and 3.18 pounds of butter-fat per 100 pounds of dry matter in the food.[2]

At the New York State Agricultural Experiment Station fourteen registered heifers were kept under observation during their entire first period of lactation. The herd included one Holstein, four Ayrshires, three Jerseys, two American Holderness, two Guernseys and two Devons. From the statistics given, I find that during the first ten full months of this period there was consumed an average of 23.70 pounds of dry matter per head per day and produced 69 pounds of milk and and 3.03 pounds of butter-fat per 100 pounds of dry matter in the food [3]

At the Experiment Station of Cornell University twenty cows were kept under observation during the year 1892.[4] Fifteen of these were in full flow of milk during the period beginning January 15th and ending April 30th, and from the data furnished, these cows appear to have consumed 30.50 pounds of dry matter per cow per day and to have produced 94 pounds of milk and 3.55 pounds of butter-fat for each 100 pounds of dry matter consumed. These cows were chiefly grade Holsteins and were much larger than those in either of the other herds, averaging 1,139 pounds, against 775 pounds for the cows at the Geneva Station, 900 for the Pennsylvania cows, 872 for the Wisconsin cows and 908 for the Ohio cows.

The Cornell cows received eight pounds of grain feed per cow per day, consisting of corn meal, bran and cotton seed meal, with ten to fifteen pounds hay and forty to fifty-five pounds corn silage.

At the Iowa Agricultural College Experiment Station eight pure-bred cows, including four Holsteins, two Shorthorns and two Jerseys, were fed for seventy-seven days in the winter of 1895 on a ration composed of nearly 11 pounds of a mixture of wheat bran, gluten meal and oil meal, with roots and hay, the total consumption of dry substance amounting to 24.23 pounds per cow per day, and the product being 111 pounds of milk, containing 4.35 pounds of butter fat, with 0.41 pound daily increase in live weight per cow.[5]

[1] Annual Report Agricultural Experimental Station, University of Wisconsin for 1892, pp. 53-71.

[2] Pennsylvania State College Agricultural Experiment Station Annual Report for 1891, pp. 92-108.

[3] New York State Agricultural Experiment Station Annual Report for 1891, pp. 28-162.

[4] Experiment Station of Cornell University, Bulletin 52.

[5] Bulletin No. 32, Iowa Agricultural Experiment Station.

In the case of these cows the feeding period was of shorter duration, and was apparently nearer the beginning of the period of lactation than in the general average of the experiments under review.

At the Utah Agricultural College Experiment Station nine grade cows were fed for 147 days, during the winter of 1894-5, on a ration containing on the average $8\frac{3}{4}$ pounds of wheat and bran in equal weights, with alfalfa and mixed hays. The total consumption of dry substance amounted to 22.74 pounds per cow per day, and the product averaged 71 pounds of milk, containing 3.25 pounds of butter fat, with 0.92 increase in live weight per cow per day.[6]

In all, about 105 cows were included in these tests (ten of the Ohio cows having been used in both of our tests).

Table I. gives a comprehensive view of the statistics I have been quoting:

Table I.—Productivity of Food as Fed to Dairy Cows.

Station.	No. of cows in test.	Average weight of cows.	Dry matter eaten per day.	Product per 100 pounds dry matter consumed.		
				Milk.	Butter fat.	*Increase in live weight.
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Ohio	31	908	24.68	69	3.20	0.36
Wisconsin	16	872	24.61	69	3.22	1.00
Pennsylvania	12	900	22.57	78	3.23	....
New York State	14	775	23.70	69	3.03	1.22
New York, Cornell	15	1,140	30.00	94	3.53	2.85
Iowa	8	1,110	24.23	111	4.35	0.41
Utah	9	1,000	22.74	71	3.25	0.92
Total and Average	105	940	24.69	76	3.32	0.94

*Omitting the Pennsylvania herd.

This table shows that, in round numbers, the 105 cows under test weighed 940 pounds each, and consumed twenty-five pounds of dry matter per cow per day, and that each hundred pounds of dry matter eaten produced one pound increase in live weight, and seventy-six pounds of milk, containing three and one-third pounds butter-fat.

Food Cost of Beef.

In Table II., I have compiled the results of a number of experiments in steer feeding, including all the recent experiments in which sufficient data have been published to form a basis of comparison.

6) Bulletin No. 43, Utah Agricultural College Experiment Station.

Table II.—Productivity of Food as Fed to Steers.

Station.	No. of steers in test.	Age at end of test.	Gain in live weight.		Reference.
			Per day.	Per 100 lbs. dry matter consumed.	
		Years.	lbs	Lbs.	
Massachusetts State	7	1	1.36	9.24	Annual Report, 1891-92.
" "	7	2	1.45	7.65	" " 1891-92.
New York State	5	1½	1.27	11.29	" " 1890.
Virginia	12	3	2.17	9.26	Bulletin 10.
Ontario	6	2	1.38	11.13	Exp. Farms Report, '91
Maryland	4	3	2.78	11.60	Bulletin 22.
Iowa	18	1	2.48	11.35	" 20.
"	18	2	3.03	9.55	" 20.
"	14	2	2.11	11.94	" 33.
Kansas	8	3	2.50	10.00	" 34 and 39.
"	20	3	1.94	9.28	" 60.
Ohio	47	3	1.91	9.24	" 60.
Total and Average	166			9.89	

In most of the tests included in these two tables the food was carefully analyzed, but in several of them the dry matter is estimated on the basis of Jenkins' and Winton's averages, published as Experiment Station Bulletin No. 11, of the United States Department of Agriculture.

For most dry feeding stuffs these averages may be accepted as approximately correct, but when the ration includes much silage there is great danger of error, as silage varies greatly in the proportion of water contained. For this and other reasons we must accept the results shown in these tables as simply approximations to the truth, to be modified by more extensive and more exact experiments in the future.

In the Kansas and Maryland experiments other lots of steers were fed in contrast with the lots whose record is quoted, but these were either fed on inferior rations or without shelter, and they should therefore not be compared with well-fed and well-sheltered cows. In the Massachusetts experiments five steers were fed through both yearling and two-year-old forms, and the same is true of the eighteen Iowa steers, so that we have but 143 different animals in the total of these tests. The Iowa and New York steers were registered animals of different breeds; the remainder were chiefly grade Short-horns.

In the general average of all these tests, it appears that the food which, when fed to cows, made a pound of butter-fat, would have made about three pounds increase of live weight if fed to young steers under similar conditions.

This ratio, it must be understood, applies only to long periods of feeding for beef as compared with long periods of milk production. For during the earlier months of lactation, as well as during the earlier months of feeding, the food is more productive than later, and therefore we must not compare fresh cows with half-fatted steers, nor lean steers with cows several months from calving.

We may find, however, that breed exerts a modifying influence on this ratio; that Jerseys, for instance, may require relatively less food for production of butter-fat, and beef breeds relatively less for increase of live weight. In short, we are only on the threshold of this problem now.

The Relation Between Gain and Loss in Live Weight and Production of Butter-Fat in Cows Giving Milk.

In working out the results of experiments in feeding for the production of milk, we find our problem complicated by the fact that the live weight of a milk-giving cow is seldom or never stationary; some cows lose in weight throughout the period of lactation; others lose during the earlier part of this period and gain during the latter part, and still others gain throughout the entire period. These last bear the reputation of poor milkers, and generally deserve it, for it is an extremely difficult matter to so feed a really good milker that she will not lose in weight.

If we are making a comparative test of two different kinds of food, as in the case of several of the experiments described in this paper, it is very important that some standard be found by which the gain or loss in live weight may be compared with the yield of milk; for it is evidently possible that the poor milker which gains in live weight may really utilize as large a proportion of her food as the large milker which loses in weight. This point is well illustrated in the great Chicago test, a general summary of which is given in Table III, compiled from results published in the *Breeder's Gazette*:

TABLE III.—Results of the Chicago Test.

Breed.	Dry matter consumed per day.	Product per 100 pounds dry matter consumed		
		Butter-fat.	Live weight.	Total
		Pounds.	Pounds.	Pounds.
Jerseys	30.00	5.20	1.13	5.58
Guernseys	26.70	4.63	.72	4.87
Shorthorns	31.30	3.56	4.19	4.96

The total product in Table III is calculated on the basis of the equivalency of one pound of butter-fat and three pounds increase in live weight, and it will be seen that this calculation still leaves the Shorthorns a little behind, but it shows the absolute necessity of making some such comparison if we would arrive at the full productivity, either of a feeding stuff or of a breed. Table IV has been compiled from the excellent statistics of the New York State Station, and illustrates the same point in another way; the same ratio as three to one being employed in calculating the total product.

TABLE IV.—Ratio of Live Weight to Milk Flow Throughout Lactation.

Product per 100 pounds dry matter consumed.	Month of lactation.									
	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Butter-fat, pounds	3.90	3.53	3.18	3.05	2.88	3.01	2.79	2.85	2.77	2.67
Live weight, pounds	* 1.50	*-1.56	*-0.29	0.08	0.67	0.72	0.93	0.97	1.22	1.18
Totals		3.01	3.08	3.08	3.10	3.25	3.10	3.17	3.18	3.06

*Loss in weight.

These cows, it will be remembered, were all less than three years old at the beginning of the test, and the table shows beautifully how the impulse toward growth and the impulse towards reproduction, as represented in the milk flow, the two most powerful

impulses which control the animal organism, may contend against each other, the live weight showing a considerable decrease during the first months of lactation but afterwards fully recovering the lost ground.

In Tables V and VI the cows employed in the tests of the Ohio, Wisconsin and two New York Stations have been grouped, first by distance from calving and next by age; the 14 cows of the New York State Station being included in each class of Table V:

TABLE V.—Effect of Advance in Lactation upon Productivity of Food.

Distance from calving.	Number of cows.	Product per 100 pounds dry matter consumed.		
		Butter-fat.	Live weight.	Total.
		Pounds.	Pounds.	Pounds.
Less than sixty days	18	4.06	*-1.22	3.65
Sixty to one hundred and twenty	26	3.43	*-0.08	3.40
One hundred and twenty to one hundred and eighty days	37	3.04	1.58	3.57
More than one hundred and eighty days	21	2.81	1.17	3.10

*Loss in weight.

TABLE VI.—Effect of Age upon Productivity of Food.

Age.	Number of cows.	Days from calving.	Product per 100 pounds dry matter consumed.		
			Butter-fat.	Live weight.	Total.
			Pounds.	Pounds.	Pounds.
Two to four years	28	150	2.94	+2.12	3.65
Five to seven years	27	171	3.41	+1.00	3.74
Eight to ten years	19	140	3.47	+0.16	3.52
Eleven to thirteen years	2	133	2.75	*-0.60	2.55

*Loss in weight.

Table V indicates a general tendency to loss in live weight during the first months of lactation, followed by a compensating gain during the later months. Table VI indicates a tendency toward growth at the expense of milk production during the earlier years of the cow's life, followed by a decline in all productive forces after the tenth year. The production of milk apparently increases until after the eighth year, while the tendency to increase in live weight steadily diminishes as the cow grows older. It will be observed that in general the variations of live weight and milk flow are found to approximately compensate each other, when compared on this basis, and that while more extensive and more accurate data are much to be desired, yet the general results of this study of the play between live weight and butter-fat production during lactation are in harmony with those of the comparison between feeding for milk and feeding for beef, and we are justified in assuming that the ratio between the increase of live weight and the production of butter-fat is not far from three to one.

APPENDIX B.

ONTARIO PROVINCIAL FAT STOCK AND DAIRY SHOW.

Officers for 1897 :

John I. Hobson, President ; J. C. Snell, Vice-President ; F. W. Hodson, Secretary-Treasurer.

Committees of Management :

Executive and Programme : The President, Vice-President, Secretary, J. E. Brethour, John Jackson and G. W. Clemons.

Committee on Cattle : John I. Hobson, J. C. Snell, G. W. Clemons, C. W. Yapp and S. Suddaby.

Committee on Sheep : R. H. Harding, John Jackson, D. G. Hanmer, D. B. Wood and H. A. Foulds.

Committee on Swine : J. E. Brethour, Geo. Green, Andrew Elliott and Thos. A. Cox.

Dairy Committee : G. W. Clemons, R. G. Murphy, R. M. Ballantyne, Geo. Hately, Harold Eagle, Henry Wade and J. M. Shuttleworth.

Poultry Committee : Geo. Wright, Duncan McEwen and J. C. Montgomery.

Reception Committee : John I. Hobson, Mayor Elliott, E. L. Goold, T. H. Preston, Arthur Johnston, Frank Cockshutt and F. W. Hodson.

Superintendent of Buildings : D. G. Hanmer, Burford.

Official Reporter : Richard Gibson, Delaware.

Secretary : F. W. Hodson, Parliament Buildings, Toronto.

A HISTORY OF THE PROVINCIAL FAT STOCK AND DAIRY SHOW.

The first annual Provincial Fat Stock Show was held in Toronto on the 14th and 15th of December, 1883, under the auspices of the Agriculture and Arts Association and the Toronto Electoral District Agricultural Society. Each society contributed $500 towards the prize list, and were to share alike in the profits and losses. No other buildings being available, the show was held in the stables of the Commercial Hotel. There were 134 entries and the premiums paid amounted to $1,330.

The second Provincial Winter Show was held in Guelph, on the invitation of the Guelph Fat Stock Club, a deputation from which society waited on the Board of the Agriculture and Arts Association. The same arrangements regarding expenses and the payment of prizes were made with the Fat Stock Club as with the Agricultural Society

of the year before. This year there were 144 entries, and the amount of premiums won was $1,020. Of this amount $510 were won by members of the Guelph Fat Stock Club, which was $10 more than the amount contributed towards the prize list by themselves.

In 1885, invitations were sent to the Council of the Agriculture and Arts Association from Stratford, Woodstock and Guelph, asking that the next Provincial Winter Show be held in their town. Deputations representing Woodstock and Guelph were also present. An agreement was entered into with the County of Oxford Fat Stock Club to hold the next Provincial Show at Woodstock, on the same conditions on which it had been held at other places. The show was held on the 9th, 10th and 11th of December. There were 146 entries, and the premiums paid amounted to $959. Of this amount $110 were won by animals owned by breeders in the County of Wellington, and 210 by breeders in the County of Oxford.

In 1886, the Show was again held in Guelph, on the 8th, 9th and 10th of December. The Agriculture and Arts Association contributed $500, and the Guelph Fat Stock Club $250, towards the prize list; the Fat Stock Club also provided accommodation There were 136 entries, to which were paid $697 in premiums. Only $159.50 were paid in premiums by the Guelph Fat Stock Club, and the amount of prizes won by members of the club was $200.

In 1887 the Show was held in Toronto, under the auspices of the Agriculture and Arts Association, on the 13th, 14th and 15th of December. As no other building was available, Mr. W. D. Grand placed his Repository at the disposal of the Agriculture and Arts Association, who were to contribute $500 towards the prize list; $90 was also donated by private individuals. There were 81 entries, and $500 were paid in premiums.

In 1888 the Agriculture and Arts Association received an invitation from the County of Oxford Fat Stock Club to hold the Provincial Show at Woodstock. It was decided, however, not to hold a show this year.

In 1889 no Provincial Fat Stock Show was held. The Agriculture and Arts Association, however, contributed $60 towards the local show held by the Guelph Fat Stock Club.

In 1890 a deputation from Guelph waited on the Board of the Agriculture and Arts Association, asking that they hold the Provincial Show that year in Guelph. The Board agreed to contribute $300 towards the prize list on condition that the Guelph Fat Stock Club contributed $200, provided accommodation, and would make up any shortage over and above the gate receipts and entry fees. This they agreed to do. The Show was held on December 10th and 11th in the Western Hotel stables; these were provided by the proprietor of the Western Hotel free of charge. There were 114 entries, and $632 paid in premiums.

In 1891 arrangements were made with the Guelph Fat Stock Club similar to those of 1890. The Show was held on the 9th and 10th of December; 81 entries were made, and $325 paid as premiums.

In 1892 a deputation from the Guelph Fat Stock Club again waited on the Board of the Agriculture and Arts Association to ask that the Provincial Fat Stock Show be again held in Guelph. This they agreed to do, provided they had the controlling of the management of the show; this they did not have in 1891, and they paid all the prize money with the exception of about $25; besides this, under the existing management the show was gradually declining. This year the Dominion Sheep and Swine Breeders' Associations joined with the Agriculture and Arts Association in holding the annual how. The result was a marked success. There were 171 entries in the various classes, almost double the number entered the preceding year. From this time forward the show seemed to have received a fresh impetus.

The following agreement was entered into for holding the show: The Agriculture and Arts Association to contribute $1,000 towards the prize list, collect all receipts and pay all expenses, and have six members on the committee of management; the Sheep

Breeders' Association to contribute $500 towards the prize list for sheep, and have two members on the committee of management; (the agreement with the Swine Breeders' Association was similar to that made with the Sheep Breeders' Association); the Guelph Fat Stock Club to provide accommodation, and to have three members on the committee of management. There were paid in premiums $1,453, over three times the amount paid in 1891.

In 1893, on the invitation of the Guelph Fat Stock Club, the Board of the Agriculture and Arts Association and the Dominion Sheep and Swine Breeders' Associations decided that the Provincial Fat Stock Show should again be held in Guelph. This year the Sheep and Swine Breeders' Association had a larger representation on the committee of management. The entries were again doubled, there being 362 against 171 in 1892. The premiums paid amounted to $2,083. The following is the agreement entered into between the Associations under whose auspices the Show was held: The Agriculture and Arts Association were to contribute $695 to the cattle classes, and $375 to each of the sheep and swine classes and collect all receipts. The Sheep and Swine Breeders' Associations were to contribute $1,000, and the Guelph Fat Stock Club was to provide accommodation. In the two years in which the Sheep and Swine Breeders' Associations had had representatives on the board of management the show had quadrupled itself.

In 1894 the Show was again held in Guelph, under the auspices of the same Associations as last year. The agreement was the same as in 1893, with the exception that the Sheep and Swine Breeders' Associations were to receive the entry fees for pure-bred sheep and swine respectively. There was again a large increase in the number of animals at the show, there being 487 entries made and $2,525 paid in prizes. As the Fat Stock Show is provincial in nature, but had been held in one district for so long a time, $1,000 was this year entered in the estimates of the Agriculture and Arts Association for the purpose of holding a Provincial Dairy Show next year in the eastern part of the Province.

The Provincial Fat Stock Show of 1895 was held in the City of Guelph on the 10th 11th and 12th of December, under the auspices of the same Associations as in 1894, with the addition of the Dairymen's Association of Western Ontario. This Association subscribed $50 towards the prize list for dairy cows. The Sheep and Swine Breeders' Associations contributed the same amount as in 1894, and the Agriculture and Arts Association $50 extra towards the prize list for dairy cows; the Guelph Fat Stock Club provided accommodation. The entries amounted to 462, and $2,628 were paid in premiums.

The first show under the present management was held in 1896. The prize list was made up as follows: The Dominion Cattle Breeders' Association, $1,145; The Dominion Sheep Breeders' Association, $1,149; The Dominion Swine Breeders' Association, $977; The Dairymen's Associations of Eastern and Western Ontario, $50 each. This was supplemented by a number of special prizes obtained by the Secretary, Mr. F. W. Hodson; the Guelph Fat Stock Club provided accommodation. The live stock associations were represented by: Cattle Breeders' Association, Messrs. John I. Hobson, David McCrae and G. E. Day; Sheep Breeders' Association, Messrs. James Tolton, R. Gibson, D. G. Hanmer and F. W. Hodson; Swine Breeders' Association, Messrs. J. E Brethour, G. B. Hood, J. C. Snell; The Dairymen's Association of Western Ontario, Messrs. A. F. McLaren, M. P., and J. W. Wheaton; The Dairymen's Association of Eastern Ontario, Messrs. R. G. Murphy and Henry Wade. These gentlemen formed the board of management and met at the Ontario Agricultural College, on June 25th. Deputations from Brantford and Guelph were present. After hearing these deputations it was decided by a vote of six to four that the Show for 1896 be held in Guelph on December 8th, 9th and 10th. The prize list and the rules to govern the show were then revised and ordered to be published.

At an Executive meeting held on July 13th tenders for the necessary printing were opened, and the Secretary was instructed to let the contracts. The printing done was as follows: 2,000 large posters 28 x 42, printed in red; 1,500 red cards 14x15, printed in black; 2,000 prize lists; and 6,000 programmes. The latter contained the programmes of the annual meeting of each of the Live Stock Associations and of the public meeting; also a notice of the Fat Stock Show, giving both freight and passenger rates to and from Guelph. A numb e of each of the above posters and programmes were posted in each

town in Ontario. The following letter was sent to each breeder of live stock in the Province, and the red cards and prize list were forwarded under separate cover:

ONTARIO AGRICULTURAL COLLEGE,
GUELPH, ONT.

DEAR SIR.—By this mail I send you one or more cards, advertising the Provincia Winter Show. Kindly post these in a conspicuous place, *where they will remain until after the Exhibition.* If you cannot post these yourself, engage someone to do it and forward the bill to me and I will remit. I also enclose you a prize list.

F. W. HODSON, *Secretary.*

The large posters were sent out as follows: Two to each Secretary of a Farmers' Institute in the Province—200; two to each President of a Farmers' Institute—200; one to each newspaper in the Province—450; one to each member of a live stock association—400. Replies were received from the majority, acknowledging the receipt of the bills and stating they had been posted as requested. The following letter was sent to these gentlemen, together with the posters:

ONTARIO AGRICULTURAL COLLEGE,
GUELPH, ONT.

DEAR SIR.—By this mail I send you one or more large posters advertising the Provincial Winter Show. Kindly put these up in a public place, where they will remain until after the Exhibition, such as a post office, a leading hotel, or other point of general interest. If you cannot put these up yourself, please engage some reliable person to do so and forward the bill to me and I will remit. Will you be good enough to attend to this matter at once. If you cannot do so please return the bills to me

Some time ago I sent you a prize list and entry form. I hope you received it. If you have animals you desire to show, kindly forward the entries as soon as possible. In making entries be good enough to name the animals you wish to enter for the Sweepstake and Special Prizes, and oblige,

F. W. HODSON, *Secretary.*

50 large posters were also posted in conspicuous places in Hamilton, 50 in London, 100 in Toronto, 200 in Guelph and in the surrounding towns and country.

The programmes were sent to the members of Parliament, the members of the Legislature, and to the press of Ontario, together with the following letter:

ONTARIO AGRICULTURAL COLLEGE,
GUELPH, ONT.

DEAR SIR.—Please find enclosed a circular letter to which we wish to draw your attention. If you can attend the Provincial Winter Show, we shall be pleased to furnish you with a complimentary ticket on your arrival at the Victoria Rink, Guelph, where my office will be located during the week of the Show.

Please bring this letter with you.

F. W. HODSON, *Secretary.*

This letter was sent that the Show might receive a notice in the local papers. The programmes were also sent to each officer or director of a Farmers' Institute in Ontario, over 1,500 in number; to each secretary of a live stock association in the United States, numbering about 125; to the live stock journals of the United States, to each known breeder of live stock in Ontario, and to many in the United States. Besides the above, they were also forwarded to each person carrying on experiments in connection with the experimental department of the Ontario Agricultural College. The wide publicity given by the foregoing advertising was demonstrated by the successful character of the Show, which far exceeded expectations. There were 611 entries, and the premiums paid amounted to $3,491. This was the most successful Provincial Fat Stock Show yet held in Ontario.

Summary of Statistics of the Provincial Fat Stock Show from its Inception in 1883 to the Present Time.

Date.	Show held at	No. of entries.	Entry fees.	Amount of premiums paid by the Agriculture and Arts Association.	Amount of premiums paid by the Sheep and Swine Breeders' Associations.	Amount of premiums paid by the Cattle Breeders' Asso.	Amount of premiums paid by entry fees, gate receipts, or other societies.	Total amount of premiums paid.	Gate receipts.	Show held under management of
			$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
1883	Toronto	134	174 25	533 77	.....	.....	796 23	1,330 00	176 90	Agriculture and Arts Association and Toronto Electoral District Agricultural Society.
1884	Guelph	144	196 25	538 29	.....	.....	481 71	1,020 00	235 63	Agriculture and Arts Association and Guelph Fat Stock Club.
1885	Woodstock	146	183 00	528 12	.....	.....	430 88	959 00	234 75	Agriculture and Arts Association and the County of Oxford Fat Stock Club.
1886	Guelph	136	157 50	500 00	.....	.....	197 00	697 00	86 10	Agriculture and Arts Association and Guelph Fat Stock Club.
1887	Toronto	81	*110 00	289 84	.....	.....	210 16	500 00	*188 50	Agriculture and Arts Association.
1888	†									
1889	‡									
1890	Guelph	114	169 50	337 50	.....	.....	294 50	632 00	56 25	Guelph Fat Stock Club and the Agriculture and Arts Association.
1891	Guelph	81	120 50	300 00	.....	.....	25 00	325 00	68 75	Guelph Fat Stock Club and the Agriculture and Arts Association.
1892	Guelph	171	220 50	623 38	671 00	.....	158 62	1,453 00	203 25	Agriculture and Arts Association, the Sheep and Swine Breeders' Associations and the Guelph Fat Stock Club.
1893	Guelph	362	386 25	865 13	928 00	.....	289 87	2,083 00	177 45	Same societies as in 1892.
1894	Guelph	487	469 25	1,328 93	772 00	.....	424 07	2,525 00	169 95	Same societies as in 1892.
1895	Guelph	463	442 25	1,544 43	789 35	.....	294 22	2,628 00	192 75	Same societies as in 1892, with the addition of the Dairymen's Association of Western Ontario.
1896	Guelph	611	607 75	.....	2,002 06	900 00	589 00	3,491 00	256 90	The Dominion Cattle, Sheep and Swine Breeders' Associations, the Dairy Associations and the Guelph Fat Stock Club.

* Estimated; the gate receipts and entry fees amounted to $298 50. † No show held this year.
‡ No show held this year; $60 was subscribed towards the prize list of the local show at Guelph.
N.B.—The entries for sweepstakes have not been included in any year. The entire number of entries for 1896 was 658.

Comparative Statement of Entries from Various Counties.

County.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Brant	9		5	6	1			4					36	57
Bruce	5	2		3									1	14
Dufferin														1
Dundas			1										1	
England			6											
Haldimand					1								4	7
Halton	1	1	26	6	4			8					12	6
Huron														5
Kent														11
Lambton	10	1	1		4			8					8	4
Lincoln													18	11
Middlesex	4	2	5	13	15			23					92	95
Norfolk													14	4
Northumberland													4	
Ontario	8				1								6	16
Oxford		1	34	7									45	58
Peel	8	4	4	5	7			7					42	68
Perth	6	9	9	10	11			8					27	32
Quebec													6	
Victoria		3											24	21
Waterloo	37	44	39	42	24			19					53	92
Wellington	35	70	12	37	9			37					61	88
Wentworth													8	11
York	11	7	4	7	4								1	10
Total	134	144	146	136	81	*	†	114	‡81	‡171	‡362	‡487	**463	611

* No show held.
† No show held; $60 were, however, given towards the local show at Guelph.
‡ Details of entries not available.
** Complete list of entries not available; the total entries amounted to about 500.
N.B.—The entries for sweepstakes have not been included in any year. The entire number of entries for 1896 was 658.

Comparative Statement of Premiums Won by Breeders from Various Counties.

County.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
	$ c.	$	$	$	$	$	$	$	$	$	$	$	$	$
Brant			20	50	15			10		111	179	86		171
Bruce	12 50			4						15	20	15		9
Dundas			10											
England			38											
Grey												25		
Haldimand											8			
Halton		10	79	20	27			37	8	8		16		20
Huron											50	65		70
Kent														66
Lambton	30 00		15		36			140	31	130	90	140		45
Lincoln										80	16			46
Middlesex	70 00		14	64	81			63		206	454	688		577
Norfolk														10
Nova Scotia												20		
Ontario	15 00				8					27	45	45		175
Oxford			210	20							82	102		468
Peel	80 00	30	28	30	32			36			198	308		384
Perth	55 00	70	97	60	70			110	93	138	153	158		165
Victoria		40									114	320		164
Waterloo	780 00	440	308	313	118			87	36	209	249	190		414
Wellington	180 00	425	110	107	101			149	157	481	307	278		492
Wentworth											69	69		110
York	107 50	5	30	29	12					48	49			165
Total	1,330 00	1,020	959	697	500	*	*	632	325	1,453	2,083	2,525	†2,628	3,491

* No Provincial Show held. † Details of premiums won in 1895 not available.

COMPARATIVE STATEMENT OF ENTRIES FROM VARIOUS COUNTIES AT THE PROVINCIAL WINTER SHOW, 1896.

County.	Cattle.	Sheep.	Swine.	Dairy.	Total.
Brant	.....	27	28	2	57
Bruce	2	12	.....	.....	14
Dufferin	1	.....	.....	.....	1
Haldimand	.....	7	.....	.....	7
Halton	1	.....	5	.....	6
Huron	5	.....	.....	.....	5
Kent	.....	.....	11	.....	11
Lambton	4	.....	.....	.....	4
Lincoln	.....	11	.....	.....	11
Middlesex	3	79	13	.....	95
Norfolk	.....	4	.....	.....	4
Ontario	16	.....	.....	.....	16
Oxford	6	8	37	7	58
Peel	.....	8	59	1	68
Perth	3	29	.....	.....	32
Victoria	2	19	.....	.....	21
Waterloo	5	65	22	.....	92
Wellington	47	29	8	4	88
Wentworth	3	5	.....	3	11
York	3	.....	.....	7	10

N.B.—The entries for sweepstakes are not included. The entire number of entries was 658.

COMPARATIVE STATEMENT OF PREMIUMS WON BY BREEDERS FROM VARIOUS COUNTIES AT THE PROVINCIAL WINTER SHOW OF 1896.

County.	Cattle.	Sheep.	Swine.	Dairy.	Total.
	$ c.	$ c.	$ c.	$ c.	$ c.
Brant	.....	78 00	58 00	25 00	171 00
Bruce	.....	9 00	.....	.....	9 00
Halton	.....	.....	20 00	.....	20 00
Huron	70 00	.....	.....	.....	70 00
Kent	.....	66 00	.....	.....	66 00
Lambton	45 00	.....	.....	.....	45 00
Lincoln	.....	46 00	.....	.....	46 00
Middlesex	30 00	467 00	80 00	.....	577 00
Norfolk	.....	10 00	.....	.....	10 00
Ontario	115 00	.....	.....	.....	115 00
Oxford	.....	55 00	228 00	185 00	468 00
Peel	.....	40 00	329 00	15 00	384 00
Perth	10 00	155 00	.....	.....	165 00
Victoria	20 00	144 00	.....	.....	164 00
Wellington	370 00	50 00	32 00	40 00	492 00
Wentworth	60 00	.....	.....	50 00	110 00
Waterloo	70 00	216 00	128 00	.....	414 00
York	35 00	.....	.....	130 00	165 00

A study of the foregoing tables will furnish a very complete history of the Provincial Winter Fair from its commencement to the present day. By noting the counties from which the greatest number of entries are received, also those which are the most successful in winning premiums, the directors will be able to arrive at a conclusion as to the place where the most successful show can be held. This should receive careful consideration, as upon your decision will depend, in a great measure, the success of our next Fat Stock Show.

FINANCIAL STATEMENT, 1896.

Receipts.

Entry fees, poultry	$ 11 75
" cattle	152 00
" dairy	42 00
" sheep	241 00
" swine	161 00
Dominion Shorthorn Breeders' Association, for prizes	110 00
Eastern Dairymen's Association, for prizes	50 00
Western " " "	50 00
W. C. Edwards, Esq., M.P., Rockland, for prizes	20 00
Dominion Cattle Breeders' Association, for prizes	900 00
" Sheep " " "	1,061 00
" Swine " " "	941 00
Sale of admission tickets and catalogues	256 90
Total	$3,996 65

Expenditure.

Cash paid for cattle prizes	$1,130 00
" sheep "	1,061 00
" swine "	941 00
Cost of superintendent and assistants	70 75
" judges in dairy department	40 45
" " cattle "	17 00
" " sheep "	28 35
" " swine "	36 25
Expenses of executive	79 45
Postage and stationery	87 70
Printing	186 80
Public meeting	66 90
General expenses	66 11
Rebate on entry fees	4 00
Balance paid Guelph Fat Stock Club for poultry entry fees	6 50
" Dominion Cattle Breeders' Association	58 13
" " Sheep " "	58 13
" " Swine " "	58 13
Total	$3,996 65

Certified correct.

(Signed) J. M. Duff,
Auditor.

LIST OF PRIZE WINNERS.

CATTLE.

SHORTHORNS.

Steer, two years and under three, one entry.

Prize, H. & W. Smith, Hay, Brampton.

Steer, one year and under two, two entries.

1. H. & W. Smith, Hay, Bruce.
2. Joseph Kirby, Armstrong's Mills, Guelph Warrior, 23103.

Steer, under one year, five entries.

1. A. & F. Bolton, Armstrong's Mills, Barney, 23639.
2. John Fried, Roseville, Clipper, 23666.
3. J. Oke & Sons, Alvinston, Rob Roy.

Highly Commended, William Dredge & Sons, Nassagaweya, White Chief, 23679.
Commended, H. & W. Smith, Hay, Bannockburn.

Cow or heifer, three years and over, three entries.

1. R. J. Robinson, Ailsa Craig, Constance 4th.
2. Robert Talbot, Everton, Bessie.
3. Jas. & P. Crerar, Shakespeare, Rosabel.

Heifer, three years, five entries.

1. John Fried, Roseville, Roseville Fancy, 26836.
2. H. & W. Smith, Hay, Gowan 2nd.
3. Jas. & P. Crerar, Shakespeare, Indian Princess.

Highly Commended, W. J. Rudd, Eden Mills, Pansy of Mt. Coffer.
Commended, Robert Talbot, Everton, Rosa Lee.

Heifer, under two years, one entry.

Prize, John Fried, Roseville, Oxford Rose. Sire, Hopewell, 15403: dam, Golden Lily, 16265.

Grade steer, two years and under three, six entries.

1. W. H. Nicols, Hamilton, Clinker.
2. James, Leask, Greenbank, Jack.
3. James Leask, Greenbank, Isaac.

Highly Commended, Wm. Rutherford, Roseville, Roseville Lad.
Commended, Thomas Russell & Son, Exeter, Billy.

Grade steer, one year and under two, five entries.

1. James Rennie, Wick, Captain.
2. Duncan Stewart, Everton, Everton Lad.
3. R. J. Robinson, Ailsa Craig, Billy.

Highly Commended, Samuel Loree, Rockwood, Roan Prince.
Commended, James Rennie, Wick, Pilot.

Grade steer, under one year, six entries.

1. John Fried, Roseville, Sandy.
2. John Campbell, Woodville, Jack.
3. James Leask, Greenbank, Jumbo.

Highly Commended, A. & F. Bolton, Armstrong's Mills, Jack.
Commended, Andrew Richardson, Peepabun, Lord Dufferin.

Best registered Shorthorn steer, any age.

Prize, H. & W. Smith, Hay.

All prizes in Shorthorn grades were donated by the Dominion Shorthorn Breeders' Association.

HEREFORDS AND POLLED ANGUS

Steer or heifer, two years and under three, four entries.

1. Alfred Stone, Guelph, Lady Sybil.
2. Hugh McDougal, Guelph, Blooming Rose 2nd, 20542. (Polled Angus)
3. James Bowman, Guelph, Heather Belle, 22610. (Polled Angus)

Highly Commended, F. W. Stone Estate, Guelph, Bullion. (Hereford)

Steer or heifer, one year and under two, five entries.

1. F. W. Stone estate, Guelph, Royal. (Hereford)
2. F. W. Stone estate, Guelph.
3. James Bowman, Guelph, Bowman's No. 1, 22688. (Polled Angus)

Highly Commended. F. W. Stone estate, Guelph. (Hereford)
Commended, Wm. Rutherford, Roseville.

Steer or heifer, under one year, three entries.

1. James Bowman, Guelph, Kyma 4th, 24534. (Polled Angus)
2. F. W. Stone estate, Guelph, Rupert. (Hereford)
3. F. W. Stone estate, Guelph, Spruce. (Hereford)

Cow or heifer, three years and over, two entries.

1. James Bowman, Guelph, Mysia 2nd, 5354. (Polled Angus)
2. Alfred Stone, Guelph, E. H. B. & A. H. R. (Hereford)

GALLOWAYS AND DEVONS.

Steer or heifer, two years and under three, five entries.

1. David McCrae, Guelph, Semiramis E., 10862 (Galloway)
2. W. J. Rudd, Eden Mills, Look Out, 1043. (Devon)
3. David McCrae, Guelph, Duchess Kototo, 10863. (Galloway)

Highly Commended, David McCrae, Guelph, Cichory, 10861. (Galloway)
Commended, W. J. Rudd, Eden Mills, Victor, 1041. (Devon)

Steer or heifer, one year and under two, three entries.

1. David McCrae, Guelph, College Bright Eyes. (Galloway)
2. W. J. Rudd, Eden Mills, Flora R., 1037. (Devon)
3. James Yule, Elder's Mills.

Steer or heifer, under one year, two entries.

1. David McCrae, Guelph, Cleo, (Galloway)
2. W. J. Rudd, Eden Mills, College Dainty, 1118 (Devon)

Cow or heifer, three years and over, three entries.

1. David McCrae, Guelph, Lady Cumloden, 10277. (Galloway)
2. James Yule, Elder's Mills.
3. David McCrae, Guelph, Good Girl, 7431. (Galloway)

Grade steer, two years and under three, six years.

1. W. H. Nicols, Hamilton, Clinker, (Shorthorn grade)
2. James Leask, Greenbank, Isaac.
3. James Leask, Greenbank, Jack.

Grade steer, one year and under two, five entries.

1. James Rennie, Wick, Chaplin.
2. Duncan Stewart, Everton, Everton Lad (Shorthorn grade).
3. R. J. Robinson, Ailsa Craig, Billy (Shorthorn grade).

Highly commended, James Rennie, Wick, Pilot.
Commended, Wm. Rutherford, Roseville.

Grade steer, under one year, five entries.

1. John Fried, Roseville.
2. John Campbell, Woodville, Jack.
3. James Leask, Greenbank, Jumbo.

Grade cow or heifer, three years and over, six entries.

1. J. Oke & Sons, Alvinston, Blossom.
2. James Bowman, Guelph, Dinah.
3. Jas. Yule, Elder's Mills, Lady.
Highly commended, James Leask, Greenbank, Hookey.
Commended, J. Oke & Sons, Alvinston, Daisy.

Grade heifer, over two years and under three, four entries.

1. James Rennie, Wick, Water Lily.
2. Peter Stewart, Everton, Lillie.
3. J. Oke & Sons, Alvinston, Red Rose.
Highly commended, Duncan Stewart, Everton.

Grade heifer under two years, five entries.

1. J. Oke & Sons, Alvinston, Lassie.
2. J. Rennie, Wick, Susie.
3. John Reddick.
Highly commended, Jas. Leask, Greenbank, Rose.
Commended, Alfred Stone, Guelph, College Fay.

CHAMPIONSHIP PRIZE, FOR BEST FAT ANIMAL ON THE GROUND, OF ANY BREED OR SEX, $20, GIVEN BY W. C. EDWARDS, ROCKLAND, ONT.

Prize, W. H. Nicols, Hamilton, "Clinker" (Shorthorn grade).

SHEEP.

Cotswold ewe, one year and under two, five entries.

1. J. G. Snell, Snelgrove, Royal Queen, 11934 (Imp.)
2. J. G. Snell, Snelgrove, Royal Lass, 11933 (Imp).
3. John Park & Sons, Burgessville, Welcome, 10837.
Highly commended, John Park & Sons, Burgessville, Oxford Bird, 10568.
Commended, Thomas Waters, Rockwood, Water's 54, 11363.

Cotswold ewe, under one year, eight entries.

1. John Park & Sons, Burgessville, Mina Cole, 8288.
2. Geo. Weeks, Glanworth, Glanworth Lass 54, 12134.
3. Geo. Weeks, Glanworth, Glanworth Lass 56, 12136.
Highly commended, Thomas Waters, Rockwood, Water's 59, 12106.
Commended, J. G. Snell, Snelgrove, Snell's Ewe 1431, 12104.

Cotswold wether, one year and under two, three entries.

1. John Rutherford, Roseville, Harry.
2. Wm. E. Wright, Glanworth, Snell's 903, 11380.
3. Wm. E. Wright, Glanworth, Snell's 1101, 11381.

Cotswold wether, under one year, six entries.

1. J. Park & Sons, Burgessville, Oxford Pride 2nd, 9306.
2. J. Park & Sons, Burgessville, Oxford Pride 3rd, 9308.
3. J. Park & Sons, Burgessville, Oxford Pride 4th, 9311.

Cotswolds, three wethers under one year, two entries.

1. John Park & Sons, Burgessville, Oxford Pride 2nd, 9306; Oxford Pride 3rd, 9308; Oxford Pride 4th, 9311.
2. J. G. Snell, Snelgrove.

Lincoln ewe, one year and under two, six entries.

1. Gibson & Walker, Denfield, G. & W. 268, 2255.
2. Wm. Oliver, Avonbank, Nanny, 1728.
3. Gibson & Walker, Denfield, G. & W. 265, 2257.
Highly commended, Wm. Oliver, Avonbank, Betsy, 1535.
Commended, Gibson & Walker, Denfield, G. & W. 267, 2258.

Lincoln ewe, under one year, four entries.

1. Gibson & Walker, Denfield, G. & W. 304, 2374.
2. Wm. Oliver, Avonbank, Ethel, 2412.
3. Gibson & Walker, Denfield, G. & W. 301, 2371.

Highly commended, Wm. Oliver, Avonbank, Netty, 2409.

Lincoln wether, one year and under two, three entries.

1. Gibson & Walker, Denfield, Lucky Lad, 1882.
2. Gibson & Walker, Denfield, Blue Face, 1883.
3. John Rutherford, Roseville.

Lincoln wether, under one year, six entries.

1. Gibson & Walker, Denfield, Wether No. 1, 2783.
2. Wm. Oliver, Avonbank, sire, Duke of Somerton, 2401.
3. Wm. Oliver, Avonbank, sire, Duke of Somerton, 2401.

Highly commended, Wm. Oliver, Avonbank, sire, Duke of Somerton, 2401.
Commended, Gibson & Walker, Denfield, Wether No. 2, 2784.

Lincolns, three wethers under one year, three entries.

1. Wm. Oliver, Avonbank.
2. Gibson & Walker, Denfield, Wether No. 1; Wether No. 2; Wether No. 3.
3. Gibson & Walker, Denfield, Wether No. 4, 2787; Wether No. 5, 2788; Wether No. 6, 2789.

Leicester ewe, one year and under two, four entries.

1. John Kelly, Shakespeare, Little Mary Main, 1219.
2. A. & W. Whitelaw, Guelph, Bonnie Bess 4th, 1379.
3. Jas. S. Smith, Maple Lodge, The Maid, 1538.

Highly commended, Orr & Lillico, Galt, Katie Orr, 1504.

Leicester ewe, under one year, seven entries.

1. A. & W. Whitelaw, Guelph, Bonnie Bess 5th, 1554.
2. John Kelly, Shakespeare, Royal Ruth, 1583.
3. John Kelly, Shakespeare, Royal Mary, 1576.

Highly commended, John Kelly, Shakespeare, Royal Olive, 1580.
Commended, Orr & Lillico, Galt, Vick, 1556.

Leicester wether, one year and under two, four entries.

1. John Kelly, Shakespeare, Dick K., 1393.
2. Orr & Lillico, Galt, Charlie, 1710
3. John Rutherford, Roseville, Dentor B., 1376.

Highly commended, John Rutherford, Roseville, Davy R., 1377.

Leicester wether, under one year, eleven entries.

1. John Kelly, Shakespeare, Duncan K., 1694.
2. Orr & Lillico, Galt, Champion, 1633.
3. Orr & Lillico, Galt, Geordy, 1558.

Highly commended, John Kelly, Shakespeare, Angus, 1683.
Commended, Orr & Lillico, Galt, Bruce, 1559.

Leicesters, three wethers under one year, two entries.

1. Orr & Lillico, Galt, Champion, Geordy, Bruce.
2. John Kelly, Shakespeare.

Oxford ewe, one year and under two, six entries.

1. J. H. Jull, Mt. Vernon, Lily 4th of Gourock, 10758.
2. Smith Evans, Gourock, Lily 3rd of Gourock, 10753.
3. J. H. Jull, Mt. Vernon, Gourock Lily, 11628.

Highly commended, Smith Evans, Gourock, Nettie 7th of Gourock, 10749.
Commended, Peter Arkell, Teeswater, Bruce Lady 3rd, 10936.

Oxford ewe, under one year, seven entries.

1. Smith Evans, Gourock, Evans' 249, 12418.
2. J. H. Jull, Mt. Vernon, Brant Queen 34, 12856.
3. Peter Arkell, Teeswater Lady 82 of 96, 12569.
Highly commended, S. Evans, Gourock, Evans' 227, 12415.
Commended, J. H. Jull, Mt. Vernon, Brant Queen 35, 12857.

Oxford wether, one year and under two, five entries.

1. Wm. E. Wright, Glanworth, Pond Mills Bill, 12809.
2. John Rutherford, Roseville.
3. Peter Arkell, Teeswater, Peter Arkell's No. 2, 2.
Highly commended, Peter Arkell, Teeswater, Peter Arkell's No. 1, 1.
Commended, Peter Arkell, Teeswater, Peter Arkell's No. 3, 3.

Oxford Wether, under one year, two entries.

1. J. H. Jull, Mount Vernon, Brant Chief, 12855.
2. John Rutherford, Roseville (thrown out).

Oxfords, three wethers under one year, one entry.

Prize, John Rutherford, Roseville, Jim 1st, Jim 2nd, Jim 3rd, (thrown out).

Shropshire Ewe, one year and under two, five entries.

1. John Campbell, Woodville, Campbell's 603, 88767.
2. John Campbell, Woodville, Campbell's 612, 88769.
3. W. H. Beattie, Wilton Grove, Hanmer's 315, 82116.
Highly commended, D. G. Hanmer & Sons, Mount Vernon, J. P. Phin's 473, 78799.
Commended, D. G. Hanmer & Sons, Mount Vernon, J. P. Phin's 783, 78809.

Shropshire Ewe, under one year, four entries.

1. John Campbell, Woodville, Campbell's 641, 88764.
2. John Campbell, Woodville, Campbell's 655, 91132.
3. D. G. Hanmer & Sons, Mount Vernon, Hanmer's 426.
Highly commended, D. G. Hanmer & Sons, Mount Vernon, Hanmer's 403, 89295.

Shropshire Wether, one year and under two, five entries.

1. John Campbell, Woodville, Perfection, 91986.
2. Richard Gibson, Delaware, Quantity, 99145.
3. D. G. Hanmer & Sons, Mount Vernon, Hanmer's 318, 82119.
Highly commended, John Campbell, Woodville, Stanlaid, 88779.
Commended, John Rutherford, Roseville, Derby, 83020.

Shropshire Wether, under one year, thirteen entries.

1. Richard Gibson, Delaware, Guiding Star, 92258.
2. D. G. Hanmer & Sons, Mount Vernon, Hanmer's 429.
3. Richard Gibson, Delaware, Grozier, 92260.
Highly commended, Richard Gibson, Delaware, Gay Monarch, 92259.
Commended, Wm. E. Wright, Glanworth, Wright's 158, 91989.

Shropshires, three wethers, under one year, six entries.

1. R. Gibson, Delaware.
2. D G. Hanmer & Sons, Mount Vernon, Hanmer's 427, Hanmer's 428, Hanmer's 429.
3. Wm. E. Wright, Glanworth, Wright's 158, Wright's 159, Wright's 160.
Highly commended, D. G. Hanmer & Sons, Mount Vernon, Hanmer's 430, Hanmer's 431, Hanmer's 432.
Commended, W. H. Beattie, Wilton Grove, Beattie's 554, Beattie's 555, Beattie's 556.

Southdown Ewe, one year and under two, twelve entries.

1. John Jackson, Abingdon, Jackson 87a, 8364.
2. John Jackson, Abingdon, Jackson 92a, 8367.
3. T. C. Douglas, Galt, Douglas Ewe 61, 8334.
Highly commended, A. Telfer & Son, Paris, Telfer Ewe, 8171.
Commended, T. C. Douglas, Galt, Douglas Ewe 62, 8335.

Southdown Ewe, under one year, eleven entries.

1. John Jackson, Abingdon, Jackson 4b, 9386.
2. John Jackson, Abingdon, Jackson 12b, 9389.
3. T. C. Douglas, Galt, Douglas Ewe 70, 9402.
Highly commended, John Jackson, Abingdon, Jackson 7b, 9387.
Commended, A. Telfer & Son, Paris, Telfer Ewe 58, 9460.

Southdown Wether, one year and under two, eight entries

1. W. H. Beattie, Wilton Grove, Bond Orr, 9093.
2. T. C. Douglas, Galt, Champion 16, 8609.
3. T. C. Douglas, Galt, Champion 17, 8610.
Highly commended, A. Simenton & Son, Blackheath, King Frank, 8304.
Commended, John Jackson, Abingdon, Jim.

Southdown Wether, under one year, seven entries.

1. T. C. Douglas, Galt, A1, 9527.
2. T. C. Douglas, Galt, A2, 9528.
3. T. C. Douglas, Galt, A3, 9529.
Highly commended, George Baker & Son, Simcoe, Mutton Maker 1.
Commended, A. Simenton & Son, Blackheath, Simenton Wether 2, 9538.

Southdowns, three wethers, under one year, four entries.

1. T. C. Douglas, Galt, A1, A2, A3.
2. T. C. Douglas, Galt, Penfold 9, Penfold 11, Penfold 12.
3. George Baker & Son, Simcoe, Mutton Maker 1, Mutton Maker 2, Mutton Maker 3.
Highly commended, A. Simenton & Son, Blackheath, Simenton Wether 1, 9537, Simenton Wether 2, 9538
No Better, 9288.

Dorset Horns and Merinos, ewe, one year and under two, four entries.

1. R. H. Harding, Thorndale, Harding's No. 63, 472 (Dorset Horn).
2. R. H. Harding, Thorndale, Harding's 61, 482 (Dorset Horn).
3. James Bowman, Guelph, Bowman No. 2 (Dorset Horn).

Dorset Horns and Merinos, ewe, under one year, four entries.

1. R. H. Harding, Thorndale, Harding's No. 72, 485 (Dorset Horn).
2. R. H. Harding, Thorndale, Harding's No. 75, 488 (Dorset Horn).
3. R. H. Harding, Thorndale, Harding's No. 74, 486 (Dorset Horn).
Highly commended, James Bowman, Guelph, Bowman's 4 (Dorset Horn).

Dorset Horns and Merinos, wether one year and under two, two entries.

1. R. H. Harding, Thorndale, Jim 496 (Dorset Horn).
2. R. H. Harding, Thorndale, Long Horn 495 (Dorset Horn).

Dorset Horns and Merinos, wether under one year, two entries.

1. R. H. Harding, Thorndale, Harding's No. 69, 497 (Dorset Horn).
2. R. H. Harding, Thorndale, Harding's No. 88, 498 (Dorset Horn).

Hampshires and Suffolks, ewe, one year and under two, two entries.

1. W. J. Rudd, Eden Mills.
2. John Kelly, Shakespeare, Jenny, 2661 (Hampshire).

Hampshires and Suffolks, ewe under one year, five entries.

1. John Kelly, Shakespeare, Wildy, 3216 (Hampshire).
2. John Kelly, Shakespeare, Midnight, 3214 (Hampshire).
3. John Kelly, Shakespeare, Black Girl, 3215 (Hampshire).
Highly commended, W. J. Rudd, Eden Mills, O. A. C. 245 (Suffolk).
Commended, W. J. Rudd, Eden Mills, O. A. C. 246 (Suffolk).

Hampshires and Suffolks, wether one year and under two, three entries.

1. John Rutherford, Roseville, Julius 1st.
2. John Rutherford, Roseville, Julius 2nd.
3. John Rutherford, Roseville.

Hampshires and Suffolks, wether under one year, three entries.

1. John Rutherford, Roseville, Jonus 1st.
2. John Rutherford, Roseville, Jonus 2nd.
3. John Rutherford, Roseville, James.

For best sheep, any breed, grade or age. Prize Spramotor No. 1, by Spramotor Company, 357 Richmond street, London, manufacturers of spraying apparatus. (Same animals as in former sections.)

Prize, W. H. Beattie, Wilton Grove, Hanmer's 315, 7007.

Sweepstake—Best sheep bred by exhibitor. Prize, Cooper Silver Cup, value $100 (Same animals as in former sections.)

Prize, Gibson & Walker, Denfield.

SPECIALS.

Offered by the American Shropshire Record Association.

Shropshire Wether, one year and under two. Five entries

1. John Campbell, Woodville, Perfection, 91986.
2. R. Gibson, Delaware.
3. D. G. Hanmer & Sons, Mt. Vernon, Hanmer's 318.

Shropshire Wether, under one year. Eleven entries.

1. R. Gibson, Delaware.
2. D. G. Hanmer & Sons, Mt. Vernon, Hanmer's 429.
3. R. Gibson, Delaware.

Shropshires, three Wether Lambs. Five entries.

1. R. Gibson, Delaware.
2. D. G. Hanmer & Sons, Mt. Vernon.
3. Wm. E. Wright, Glanworth.

CLASS B., SEC. 4.—*Shropshire Grade, Wether, sired by registered Shropshire ram out of grade ewe, one year and under two, eight entries.*

1. John Campbell, Woodville, Campbell's 2.
2. John Kelly, Shakespeare, grade wether.

Shropshire grade wether, sired by registered Shropshire ram out of a grade ewe, under one year, eight entries.

1. John Campbell, Woodville, grade wether.
2. John Campbell, Woodville, grade wether.

SPECIAL.

By American Southdown Breeders' Association.

SOUTHDOWNS.—Pen of four lambs, two rams and two ewes, owned and bred by exhibitor; animals to be recorded in the American Southdown Record.

Prize, the first five volumes of American Southdown Record; two entries.

Prize, John Jackson, Abingdon.

Grade Ewe, one year and under two, six entries.

1. John Campbell, Woodville, Fat Back.
2. Wm. E. Wright, Glanworth, Shropshire Grade.
3. Orr & Lillico, Galt, Kate.

Highly Commended, Orr & Lillico, Galt, Belle.
Commended, Orr & Lillico, Galt, Bess.

Grade Wether, one year and under two, eleven entries.

1. Gibson & Walker, Denfield, Homer.
2. John Campbell, Woodville, Campbell's No. 1.
3. John Kelly, Shakespeare.

Highly Commended, John Campbell, Woodville, Campbell's No. 2.
Commended, John Rutherford, Roseville, Billie.

Three Grade Wethers, under one year, eight entries.

1. John Campbell, Woodville, Campbell's 3, Campbell's 4, Campbell's 5.
2. Orr & Lillico, Galt.
3. John Rutherford, Roseville, John 1, John 2, John 3.

Highly commended, Wm. E. Wright, Glanworth.
Commended, James Bowman, Guelph.

Grade Wether, under one year, three entries.

1. John Campbell, Woodville, Campbell's No. 3.
2. Orr & Lillico, Galt.
3. John Campbell, Woodville, Campbell's 4.

Highly commended, Orr & Lillico, Galt, Jack.
Commended, John Rutherford, Roseville, John II.

Grade Ewe under one year, eight entries.

1. John Campbell, Woodville, Campbell's No. 6.
2. Gibson & Walker, Denfield, Birdie.
3. Wm. Oliver, Avonbank.

Highly commended, W. H. Beattie, Wilton Grove.
Commended, Jas. Scott, Aberfoyle, Scott Ewe.

Grade Sheep, under two years, ten entries.

1. Gibson & Walker, Denfield.
2. John Campbell, Woodville.
3. John Campbell, Woodville.

SWINE.

Berkshire Barrow, nine months and under fifteen, three entries.

1. J. G. Snell, Snellgrove, Snell's P. H. L., 4346.
2. J. G. Snell, Snelgrove, Oliver, 4345.
3. John Kitching, Corwhin, Gold Boy, 4296.

Berkshire Barrow, six months and under nine, two entries.

1. J. G. Snell, Snelgrove, Masher, 4342.
2. J. G. Snell, Snelgrove, Highclere is Prince, 4341.

Berkshire Sow, nine months and under fifteen, two entries.

1. J. G. Snell, Snelgrove, Snelgrove Belle, 4549.
2. J. G. Snell, Snelgrove, Snelgrove Belle 2nd, 4768.

Berkshire Sow, six months and under nine, three entries.

1. J. G. Snell, Snelgrove, Snell's Highclere 7, 4551.
2. J. G. Snell, Snelgrove, Snell's Highclere 8, 4552.
3. J. G. Snell, Snelgrove, Rose Bud, 4765.

Berkshire Sow or Barrow, under six months, three entries

1. J. G. Snell, Snelgrove, New Fashion, 4344.
2. J. G. Snell, Snelgrove, Actress, 4747.
3. J. G. Snell, Snelgrove, Ruby, 4766.

Berkshires, three pigs, the offspring of one sow, bred by exhibitor, two entries.

1. J. G. Snell, Snelgrove, Snelgrove Bella, Snelgrove Bella 2nd, Snell's P. H. L.
2. J. G. Snell, Snelgrove, Highclere Prince, Snell's Highclere 7th, Snell's Highclere 8th.

Yorkshire Barrow, nine months and under fifteen, four entries.

1. Henry Deddles, Kossuth, Waterloo Sweepstake, 2377.
2. Henry Deddles, Kossuth, Kossuth None Such, 2378.
3. Jos. Featherston, Streetsville, Mammoth Midge, 2371.
Highly commended, Jos. Featherston, Streetsville, King Midge, 2370.

Yorkshire Barrow, six months and under nine, three entries

1. Henry Deddles, Kossuth, Long Tom, 2379.
2. Jos. Featherston, Streetsville, Holy Well York, 2277.
3. Jos. Featherston, Streetsville, Holy Well Peer, 2278.

Yorkshire Sow, nine months and under fifteen, six entries.

1. Henry Deddles, Kossuth, Kossuth Daisy, 2478.
2. Jos. Featherston, Streetsville, Sequel, 2396.
3. Jos. Featherston, Streetsville, Sequel 2nd, 2460.
Highly commended, Jos. Featherston, Streetsville, Telephone, 2459.
Commended, J. E. Brethour, Burford, Mistress 5th, 2422.

Yorkshire Sow, six months and under nine, eight entries.

1. Henry Deddles, Kossuth, Dolly, 2480.
2. J. E. Brethour, Burford, Oak Lodge Pink.
3. Henry Deddles, Kossuth, Molly, 2481.
Highly commended, Jos. Featherston, Streetsville, Columbian Maid, 2384.
Commended, J. E. Brethour, Burford, Oak Lodge Pink 2.

Yorkshire Sow or Barrow, under six months, two entries.

1. Jos. Featherston, Streetsville, Stella's Best, 2461.
2. Henry Deddles, Kossuth, Little Fatty, 2380.

Yorkshires, three pigs, the offspring of one sow, bred by exhibitor, four entries.

1. Henry Deddles, Kossuth, Waterloo Sweepstake, 2377, Kossuth None Such, 2393, Kossuth Daisy, 2478.
2. Jos. Featherston, Streetsville, Sequel, 2396, Sequel 2nd, 2460, Telephone, 2459.
3. J. E. Brethour, Burford, Oak Lodge Pink, Oak Lodge Pink 2nd, Oak Lodge Pink 3rd.
Highly commended, Henry Deddles, Kossuth, Waterloo Beauty, 2479, Dolly, 2480, Molly, 2481.

Chester White barrow, nine months and under fifteen, three entries.

1. Wm. Butler & Son, Dereham Centre, Small Boy, 713.
2. R. H. Harding, Thorndale, Hart, 754.
3. Wm. Butler & Son, Dereham Centre, Winner's Pride, 712.

Chester White barrow, six months and under nine, three entries.

1. Wm. Butler & Son, Dereham Centre, Byrar, 751.
2. R. H. Harding, Thorndale, Luke, 755.
3. Wm. Butler & Son, Dereham Centre, Entipin, 758.

Chester White sow, nine months and under fifteen, two entries.

1. Wm. Butler & Son, Dereham Centre, Maud, 840.
2. Wm. Butler & Son, Dereham Centre, Laura.

Chester White sow, six months and under nine, two entries.

1. Wm. Butler & Son, Dereham Centre, Ida, 880.
2. Wm. Butler & Son, Dereham Centre, Lulu, 879.

Chester White sow or barrow, under six months, three entries.

1. Wm. Butler & Son, Dereham Centre, Bertha.
2. Wm. Butler & Son, Dereham Centre, Alice.
3. R. H. Harding, Thorndale, Tillie, 876.

Chester Whites, three pigs, the offspring of one sow, bred by exhibitor, two entries.

1. Wm. Butler & Son, Dereham Centre.
2. Wm. Butler & Son, Dereham Centre.

Poland China barrow, nine months and under fifteen, two entries.

1. W. M. & J. C. Smith, Fairfield Plains, Jim.
2. W. M. & J. C. Smith, Fairfield Plains, Dandy.

Poland China barrow, six months and under nine, four entries.

1. W. & H. Jones, Mt. Elgin, McKinley, 914.
2. W. M. & J. C. Smith, Fairfield Plains, Ben.
3. W. & H. Jones, Mt. Elgin, Bryan, 915.

Highly commended, W. M. & J. C. Smith, Fairfield Plains, Billie.

Poland China sow, nine months and under fifteen, three entries.

1. W. & H. Jones, Mt. Elgin, Lady Darkness, 1067.
2. W. & H. Jones, Mt. Elgin, Black Perfection, 1068.
3. W. M. & J. C. Smith, Fairfield Plains, Josie, 1016.

Poland China sow, six months and under nine, four entries.

1. W. & H. Jones, Mt. Elgin, Graceful Queen, 1070.
2. W. & H. Jones, Mt. Elgin, Maud, 1069.
3. W. M. & J. C. Smith, Fairfield Plains, Lucy.

Highly commended, W. M. & J. C. Smith, Fairfield Plains, Jane.

Poland China sow or barrow, under six months, four entries.

1. W. M. & J. C. Smith, Fairfield Plains, Jack.
2. W. M. & J. C. Smith, Fairfield Plains, Susan.
3. W. & H. Jones, Mt. Elgin, Eclipse, 917.

Highly commended, W. & H. Jones, Mt. Elgin, Juno, 1072.

Poland Chinas, three pigs, the offspring of one sow, bred by exhibitor, three entries.

1. W. & H. Jones, Mt. Elgin, Maud, McKinley, Lady Darkness.
2. W. & H. Jones, Mt. Elgin, Black Perfection, Graceful Queen, Bryan.
3. W. M. & J. C. Smith, Fairfield Plains.

Suffolks and Essex, barrow, nine months and under fifteen, three entries.

1. Jos. Featherston, Streetsville, Ida's King, 225.
2. Robert Dorsey, Burnhamthorpe, Exhibition Boy, 228.
3. Jos. Featherston, Streetsville, Black Bob, 10.

Suffolks and Essex, barrow, six months and under nine, two entries.

1. Jos. Featherston, Streetsville, Essex Bacon, 13.
2. Jos. Featherston, Streetsville, Essex Pork, 12.

Suffolks and Essex, sow, nine months and under fifteen, four entries.

1. Robert Dorsey, Burnhamthorpe, Dolly, 244.
2. Jos. Featherston, Streetsville, Ida's Queen, 235.
3. Robert Dorsey, Burnhamthorpe, Peggy, 245.

Highly commended, A. Frank & Sons, The Grange, Sally.

Suffolks and Essex, sow, six months and under nine, four entries.

1. Jos. Featherston, Streetsville, Souvenir, 237.
2. Robt. Dorsey, Burnhamthorpe, Fat Bessy, 246.
3. Robt. Dorsey, Burnhamthorpe, Beauty, 247.

Highly commended, Jos. Featherston, Streetsville, Souvenir Bell, 241.

Suffolks and Essex, sow or barrow, under six months, six entries.

1. Jos. Featherston, Streetsville, Josephine, 19.
2. Jos. Featherston, Streetsville, Topsy, 17.
3. Robt. Dorsey, Burnhamthorpe, Show Boy, 230.
Highly commended, Robt. Dorsey, Burnhamthorpe, Silver Lass, 249.
Commended, Robt. Dorsey, Burnhamthorpe, Gold Lass, 250.

Suffolks and Essex, three pigs, the offspring of one sow, bred by exhibitor, three entries.

1. Robt. Dorsey, Burnhamthorpe, Exhibition Boy, Dolly, Peggy.
2. Jos. Featherston, Streetsville, Ida's Queen, Souvenir Bell, Souvenir.
3. Robt. Dorsey, Burnhamthorpe, Show Boy, Silver Lass, Gold Lass.

Tamworth barrow, nine months and under fifteen, three entries.

1. Andrew Elliott, Galt, Castor, 533.
2. Andrew Elliott, Galt, Polling, 532.
3. H. George & Sons, Crampton, Sandy, 534.

Tamworth barrow, six months and under nine, two entries.

1. H. George & Sons, Crampton, Sandy 2nd, 536.
2. H. George & Sons, Crampton, Bill, 530.

Tamworth sow, nine months and under fifteen, four entries.

1. H. George & Sons, Crampton, George's Best 2nd, 603.
2. Andrew Elliott, Galt, Concord Princess, 601.
3. A. C. Hallman, New Dundee, Edna.
Highly commended, A. C. Hallman, New Dundee, Erena.

Tamworth sow, six months and under nine, three entries.

1. H. George & Sons, Crampton, Rosa, 604.
2. H. George & Sons, Crampton, Lena, 605.
3. A. C. Hallman, New Dundee, Sylvia.

Tamworth, sow or barrow, under six months, three entries.

1. H. George & Sons, Crampton, Dandy, 607.
2. H. George & Sons, Crampton, May, 606.
3. Andrew Elliott, Galt, Concord Pet, 602.

Tamworths, three pigs, offspring of one sow, bred by exhibitor, four entries.

1. Andrew Elliott, Galt, Castor, Polling, Concord Queen.
2. H. George & Sons, Crampton, Sandy, George's Best, Dandy.

Jersey red barrow, nine months and under fifteen, two entries.

1. Wm. Butler & Son, Dereham Centre, Ona Boy, 135.
2. Wm. Butler & Son, Dereham Centre, Dandy Boy, 134.

Jersey red barrow, six months and under nine, four entries.

1. Tape Bros., Ridgetown, Silverite, 140.
2. Tape Bros., Ridgetown, Gold Bug, 139.
3. Wm. Butler & Son, Dereham Centre, Ben Book, 136.
Highly commended, Wm. Butler & Son, Dereham Centre, Straight Ear, 137.

Jersey red sow, nine months and under fifteen, three entries.

1. Tape Bros., Ridgetown, Sally, 156.
2. Wm. Butler & Son, Dereham Centre, Queen Ann, 176.
3. Wm. Butler & Son, Dereham Centre, Favorite, 177.

Jersey red sow, six months and under nine, five entries.

1. Tape Bros., Ridgetown, Favorite, 183.
2. Tape Bros., Ridgetown, Faultless, 153.
3. Wm. Butler & Son, Dereham Centre, Red Girl, 178.
Highly commended, Wm. Butler & Son, Dereham Centre, Brightness, 179.

Jersey red sow or barrow under six months, four entries.

1. Tape Bros., Ridgetown, Ned, 138.
2. Tape Bros., Ridgetown, Royal Princess, 182.
3. Wm. Butler & Son, Dereham Centre, Dolly, 181.

Highly commended, Wm. Butler & Son, Dereham Centre, Hopeful, 180.

Jersey reds, three pigs, offspring of one sow, bred by exhibitor, three entries.

1. Tape Bros., Ridgetown, Favorite, Gold Bug, Faultless.
2. Wm. Butler & Son, Dereham Centre, offspring of Daisy A.
3. Wm. Butler & Son, Dereham Centre, offspring of Daisy A.

Sweepstake for best pure-bred barrow, any age or breed, same animals as in former sections.

1. Henry Deddles, Kossuth, Kossuth None Such, 2378.
2. J. G. Snell, Snelgrove.
3. W. M. & J. C. Smith, Fairfield Plains, Jim.

Sweepstake for best pure-bred sow, any age or breed, same animals as in former sections.

1. J. G. Snell, Snelgrove.
2. W. & H. Jones, Mt. Elgin.
3. H. Deddles, Kossuth.

Grade barrow, nine months and under fifteen, two entries.

1. J. G. Snell, Snelgrove.
2. Robert Agnew, Acton.

Grade barrow, under nine months, eight entries.

1. Geo. Sleeman, Guelph.
2. Geo. Sleeman, Guelph.
3. A. & F. Bolton, Armstrong's Mills.

Grade sow, nine months and under fifteen, two entries.

1. W. & H. Jones, Mt. Elgin, Daisy.
2. Robert Agnew, Acton.

Grade sow, under nine months, ten entries.

1. J. G. Snell, Snelgrove, Black Girl.
2. Geo. Sleeman, Guelph.
3. W. M. & J. C. Smith, Fairfield Plains, Jennie.

Highly commended, Geo. Sleeman, Guelph.
Commended, Samuel Congdon, Acton.

DAIRY DEPARTMENT.

Ayrshire cow, thirty-six months and over, three entries.

1. Naaman Dyment, Clappison, Dandy, 2223.
2. W. M. & J. C. Smith, Fairfield Plains, Gusta 19, 1960.
3. W. M. & J. C. Smith, Fairfield Plains, Pauline Hall, 2241.

Ayrshire cow, under thirty-six months, one entry.

1. Wm. Temple Thompson, Rockton, Rose Morton, 2992.

Holstein cow, thirty-six months and over, four entries.

1. A. & G. Rice, Curries, Calamity Jane, 1156.
2. A. Hoover, Emery, Edgely Frena, 1074.
3. A. & G. Rice, Curries, Catholine 5th., 1158.

Highly commended, A. & G. Rice, Curries, Daisy Leal, 335.

Holstein cow, under thirty-six months, two entries.

1. A. & G. Rice, Curries, Iolena Fairmont 3rd., 1159.
2. A. & G. Rice, Curries, Bright Promise, 1432.

Jersey or Guernsey cow, thirty-six months and over, three entries.

1. J. H. Smith & Sons, Highfield, Signal Rosea May, 50092.
2. B. H. Bull & Son, Brampton, Corinne of Don, 86947.
3. J. H. Smith & Sons, Highfield, Elen of Oakdale, 84162.

Jersey or Guernsey cow, under thirty-six months, two entries.

1. J. H. Smith & Sons, Highfield, Queen of Highfield, 107096.
2. J. H. Smith & Sons, Highfield, Ida of Highfield, 110419.

Grade cow, thirty-six months and over, five entries.

1. A. & G. Rice, Curries, grade Holstein.
2. J. R. Grieve, Guelph, grade Durham.
3. T. H. Dent, Woodstock, grade.

Highly commended, James Hurley, Guelph, Spotty.
Commended, J. & A. Tyson, Guelph, Bella.

Grade cow under thirty-six months, one entry.

1. James Hurley, Guelph, Molly.

DAIRY TEST.

Best dairy cow, any age, breed or grade, judged according to the rules governing the Dairy Department.

1. A plow, value $15, donated by the Wilkinson Plow Co., Ltd., manufacturers of plows, scrapers, wheel-barrows, etc., Toronto, Ont.
2. A No. 1 leader corn and root cultivator, value $10, donated by Thom's Implement Works, manufacturers of high-class farm implements, Watford, Ont.

The Holstein-Friesian Association of America offered as specials in this class, $25 for the first, and $15 for the second, to be paid to any Holstein-Friesian cows winning premiums in competition with cattle of other breeds, providing such animals are recorded in the herd book of said Association.

The following prizes were offered as specials in this class by the Canadian Holstein-Friesian Association:—For the best dairy cow, $25; for the two next best Holstein-Friesian dairy cows, registered in the C. H. F. H. B., $15 and $10, respectively. Same animals as in former sections.

1. A. & G. Rice, Currie's, Calamity Jane, 1156.
2. A. Hoover, Emery, Edgely Frema, 1074.

Highly commended, A. & G. Rice, Currie's.
Commended, A. & G. Rice, Currie's.
Reserve, A. &. G. Rice, Currie's.

THIRTEENTH PROVINCIAL FAT STOCK AND DAIRY SHOW, 1896.

BY J. C. SNELL.

The Smithfield of Canada, as the Ontario Provincial Fat Stock Show has been called, held in Victoria Rink in the city of Guelph, December 8th to 10th, was the best exhibition of the kind ever convened in Canada. It may be true that some of the previous meetings may have been characterized by a more striking individuality in some of its numbers, but the general levelling up in quality and type, which was the most prominent feature of the Show this year, was matter for sincere congratulation.

The improved classification provided for in the prize list, giving separate classes to all the breeds in which there was likely to be much competition, instead of grouping

them together as in former years, proved a successful reform and added materially to the interest of the exhibition. The effect was a substantial increase in the number of entries and exhibitors without any deterioration in the quality of the animals shown. The steady advance of this institution in late years, and especially the last year, is no doubt largely due to the more complete organization of the various Breeders' Associations, under whose auspices the Show is held. The management of the exhibition which is now mainly in the hands of practical farmers and breeders, was this year very satisfactory and reflects credit on those on whom the duties of its direction principally fell. The public, too, manifested an increasing appreciation of the good points of the Show by a larger attendance than usual. The total number of entries exceeded those of 1895 by over 100. The judges were well selected and performed their duties carefully and to the satisfaction of exhibitors, and the critical onlookers who are usually not slow to express their views outside the ring.

CATTLE.

The exhibit of cattle while greater in numbers than in any former year, was quite equal in regard to quality and uniformity of type, if indeed it was not an improvement in these respects, as we are inclined to think it was; but there was a notable absence of striking individuality. Shorthorns and their grades were, as usual, largely in the majority, but it was gratifying to find a considerably increased representation of the other beef breeds, viz., Herefords, Polled Angus, Galloways, and Devons, which added materially to the interest of the Show.

Shorthorns. The exhibitors in the class for registered Shorthorns were H. & W. Smith, Exeter; Jos. Kirby, Armstrong's Mills; Wm. Dredge, Nassageweya; A. & F. Bolton, Armstrong's Mills; John Fried, Roseville; Robert Talbot, Eramosa; J. & P. Crerar, Shakespeare; Jas. Oke & Sons, Alvinston; R. J. Robinson, Ailsa Craig; W. J. Rudd, Eden Mills; and Isaac Groff, Elmira. As the list of winners is published in connection with this report, space will not permit of detailed mention of all the animals successful in winning honors, and reference will simply be made to the more outstanding features of the Show.

In the section for steers two years old and under three, H. & W. Smith showed the only entry, the white steer "Brampton," of medium size for age, but blocky, thick fleshed, and of fine quality. In yearling steers the competition was keen and close. Mr. Groff showed an exceedingly good one in "Roan Duke," bred by Mr. Charlton, of London. He was a typical butcher's steer, and a good example of a profitable animal from the standpoint of a feeder, smooth and firm in all parts, thickly fleshed on back and loins, free from paunchiness, covered with a mossy coat of silky hair, and having a stylish and and breedy appearance. He was an ideal steer in every respect, though not in the highest condition. He was awarded the first place in the prize list, but was on protest ruled out, on account of irregularities in the entry, and failure of his owner to produce evidence that he was eligible to registry.

H. & W. Smith's white steer, "Bruce," a thick fleshed, deep bodied, well fatted animal, was placed second, and on the protest being sustained drew the first money.

The section for cows or heifers three years and over included three exceedingly good ones, Crerar's "Rosabel," Robinson's "Constance 4th," and Talbot's "Bessie." The two acting judges differed as to which of the two latter named should have first place, and the referee decided in favor of Mr. Robinson's entry. She was firm, smooth, and well finished. All were good ones, but the others were not so fully finished for the block.

Two year old heifers made a very strong section. Mr. Fried's "Roseville Fancy" was placed first. She was one of the very best animals in the Show. Her broad, thickly fleshed back, well sprung ribs, deep flanks, level quarters, and fine breed character won for her special admiration. The same exhibitor showed the first prize yearling heifer, a very worthy one, long, level, and firmly fleshed.

Grades and Crosses. There were two sets of prizes offered at this Show for grade steers, one by the Shorthorn Breeders Association for Grade Shorthorns, the other by the

General Association for grades and crosses of any breed. The same animals were practically the winners in both classses, the only exception being that of second prize cow which was awarded to Mr. Bowman, of Guelph, for the Polled Angus Grade Cow, "Dinah," an exceedingly good one.

The exhibitors in this class were W. H. Nichols, Hamilton; Jas. Leask, Greenbank; Thos. Russell & Son, Exeter; Jas. Bowman, Guelph; Samuel Loree, Rockwood; Duncan Stewart, Everton; R. J. Robinson, Ailsa Craig; Jas. Rennie, Wick; John Fried, Reseville; Andrew Richardson, Peepabun; John Campbell, Woodville, and Henry Deddels, Kossuth.

The class was strong in all its sections, being well filled with meritorious entries. Among the most notable was Mr. Nichol's red steer "Clinker," in the section for those over two and under three years. He was the first prize calf at the Show of 1894, and the first prize yearling in 1895. He has made a great record for early maturity at these three annual Shows, his weight at eleven months being 990 pounds; at 22 months, 1,730 pounds; and at two years and eleven months, 2,275 pounds. A glance at these figures will be sufficient to confirm what has repeatedly been demonstrated that the greatest profit in feeding is attained in the case of the steer under two years old. This steer was admittedly too large for the demands of the general market in these times, and the last years feeding would probably not have been profitable but for the fact that a fancy price was obtained for his carcass for Christmas show beef as the result of his success as a winner. It must be admitted, however, that he was an extraordinary steer, carrying his wealth of flesh smooth and firm without any appearance of coarseness, and he could not well be denied his final honors which were first prize in his class, and the championship prize for best fat beast in the show, of any age or class. His owner claims that this steer won $180 in prizes in the three years of his life, and was sold for $200 for the Christmas market of St. John, N.B.

Mr. Leask's roan steer, "Jack," shown in the same section though almost a year younger, was a model of the handy sort which the trade calls for, weighing 1,500 pounds at twenty-five months and fully finished for the best markets. He had a grand skin to cover him and mossy hair to handle. His back was thickly covered with firm flesh, and his whole conformation was satisfactory. Barring the big steer it was probably a question between him and the Groff steer for the championship, as they were nearly of the same type. Mr. Rennie's first prize steer in the section for yearlings was a light roan, named "Captain," and he was among the best things in the Show. His weight was 1,600 pounds, his flesh firm and smoothly distributed, his skin and hair faultless, and his whole make up very nearly perfect.

In steers under one year the first prize was given to Mr. Fried's entry, a very promising youngster, followed by John Campbell's for second prize, a smooth calf with a strong back and good promise for future outcome. Grade cows or heifers over three years old were a strong class, and Mr. Oke's "White Blossom," a substantial, smooth, and well finished cow was declared the winner.

Mr. Rennie was awarded first honors in the section for two-year-old heifers for "Water Lily," which was one of the best numbers in the Show for smoothness, firmness, and quality of flesh, and there were those who would have given her their vote even for the Championship, so good was she.

Herefords and Polled Angus were grouped together, the former being shown by Alfred Stone, and the estate of the late F. W. Stone, and the latter by James Bowman, all of Guelph. Some excellent animals of both breeds were shown, and the prizes were distributed between the three exhibitors.

Galloways and Devons were classed together, and the black skins especially made a very creditable showing, though they were not in as high condition as one would expect in a fat stock competition. The exhibitors were David McCrae, Guelph, and James Yule, Elder's Mills, the former winning all the prizes, except one second and one third, which went to Mr. Yule.

Dairy Cows. The dairy branch of the Show is as yet comparatively a new feature, and has not drawn out large competition. Holsteins, Jerseys and Ayrshires were represented in very limited numbers, as were also grades of these breeds. The exhibitors of Holsteins were A & G. Rice, Currie's Crossing, and A. Hoover, Emory; of Jerseys, J. H. Smith & Son, Highfield; B. H Bull & Son, Brampton; of Ayrshires, W. M. & J. C. Smith, Fairfield Plains, and N. Dyment, Clappison.

The test took the form of a milking trial for two days without regard to the amount or cost of food consumed, and though no sensational records were scored, the test showed the undoubted capacity of some of the cows for yielding a large quantity of milk, and of others to produce milk very rich in butter-fat. The first prize Holstein cow, "Calamity Jane," also won the sweepstakes for best of any breed. She gave an average of 67 pounds of milk per day, with an average per cent. of 2.96 of butter-fat The first prize Jersey cow gave an average of 29½ pounds of milk daily, and an average per cent of 5.47 of butter-fat. The third prize Jersey cow tested 5.96 butter-fat. The first prize Ayrshire cow gave 41.85 pounds of milk and tested 3.44 butter-fat, and the third prize cow tested 4 25.

Sheep.

The exhibit of sheep at the Provincial Fat Stock Show for 1896, it is safe to say, was the best ever collected at a fat stock show in America. The opening of separate classes for each breed where in former years two or more breeds were grouped together, had the effect of bringing out several more exhibitors, a larger number of entries, and a better show all around. There were in all about three hundred sheep on exhibition, and the number of exhibitors was about thirty. The keenest interest was taken in the Show by both exhibitors and visitors, who watched the judging closely for two full days, and it is safe to say that many young farmers and breeders received lessons on the judging of animals which will be of lasting usefulness to them in their occupation. The outlook for the sheep trade in the near future is, perhaps, more encouraging than that of any other line of stock raising, and the Canadian sheep breeders are fully alive to the importance of the industry they are engaged in. The only regret is that the farmers of the country do not more generally keep a limited number of sheep, and thus be prepared to share in what promises to be one of the most profitable, while it is certainly one of the safest branches of live stock husbandry, and one which can be taken up at a very moderate outlay.

Cotswolds were the first class on the list, and were first called before the judges. This breed has been scarcely represented at former Shows here for several years past, and this year, while a few very good ones were shown, they did not make nearly so good a showing as they did at the autumn shows, where they were out in strong force and excellent quality. Cotswold breeders have not used the pruning knife as freely as breeders of other classes, and hence have not made a creditable show in the sections for wethers, which is one of the most interesting in a fat stock show.

The exhibitors in this class were J. G. Snell, Snelgrove; John Park & Son, Burgessville; Geo. Weeks, Glanworth; Thos. Waters, Rockwood; John Rutherford, Roseville; and W. E. Wright, Glanworth The strongest numbers in the class were Mr. Snell's pair of imported ewes, and Mr. Park's ewe lambs. The former were fitted for the English shows and had gone the round of Canadian Fall Fairs, winning first-class honors, and were noble specimens of the breed—lengthy, broad, firmly fleshed, and covered with handsome fleeces of fine lustrous wool. Mr. Park had a very creditable ewe for third place in this section, and his ewe lamb furnished the first prize entry,—a remarkably good one, showing strong breed character, standing on strong straight legs, and having a firmly fleshed back. Mr. Weeks had a good one for second honors, well up to the standard of the breed and well brought out.

Lincolns. While there were only two exhibitors in this class, namely, Gibson & Walker, Denfield, and Wm. Oliver, Avonbank, the breed was well represented by animals of high-class character and well fitted for the Show. In each of the sections for ewes the competition was close, and the judges took a long time to arrive at a decision. Gibson &

Walker in each case won the first and third awards and Mr. Oliver took second place. The first prize yearling ewe made a splendid record for herself and her breeders by bringing to the flock for the second time in succession the $100 silver cup donated by the Cooper Sheep Dip Company for the best sheep in the Show bred by the exhibitor. She was indeed a remarkable ewe, showing strong breed character, a long, level, firm back, well covered with flesh and carrying a splendid fleece of long lustrous wool. The yearling wethers shown by the same firm were a massive pair full of first-class quality, and were awarded first and second prizes. Throughout the whole class there was not an inferior animal shown.

Leicesters. In this class the exhibitors were J. S. Smith & Son, Maple Lodge; John Kelly, Shakespeare; A. & W. Whitelaw, Guelph, and Orr & Lillico, Galt The breed was well represented. The ewe sections were especially strong. In the section for yearling ewes each of the above-named exhibitors had an entry of high-class merit, and the judges had no easy task to decide in what order they should be placed The Whitelaw ewe had many admirers for her strong, firm back and general excellence, but the judges decided in favor of Kelly's ewe for first place, her wonderful brisket and well-sprung ribs giving her a very fascinating appearance despite a slight slackness in her loins. The ewe lambs in this class were a fine example of early maturity, having in the hands of such successful feeders as the Whitelaws and Kelly attained great size and weight for their age. In this case the Whitelaws scored first in a keen contest and Kelly second. The wether lambs in this class were also very good, Mr. Kelly winning first prize and Orr & Lillico second. The latter firm had the first prize pen of three wethers under a year, an excellent trio.

Oxfords, which dropped out last year, were again forward on this occasion in goodly numbers and well up in quality and character. The flocks represented were those of Smith Evans, Gourock; Peter Arkell, Teeswater; J. H. Jull, Mount Vernon; W. E. Wright, Glanworth, and John Rutherford, Roseville. The first prize yearling ewe at the Toronto Exhibition, shown there by Mr. Evans, was here in the hands of Mr. Jull, who was awarded first prize for her and third for her mate, Mr. Evans coming in for second place. The contest was close in this case, the two acting judges having differed as to where first honors should go and the reserve judge had to break the tie. Ewe lambs were a very strong section, Mr. Evans winning first premium with an imported lamb of fine quality, followed by Mr. Jull for second and Mr. Arkell for third. In wethers Mr. Wright had out an uncommonly good and well-finished sheep which was placed first, and Mr. Rutherford had a worthy second in one of his ripe mutton sheep.

Shropshires, as usual at these Shows, attracted much attention and made a grand display. Several of the leading flocks of the Province were well represented. The exhibitors were John Campbell, Woodville; D. G. Hanmer & Sons, Mount Vernon; John Rutherford, Roseville; R. Gibson, Delaware; W. E. Wright, Glanworth, and W. H. Beattie, Wilton Grove. The five yearling ewes shown were an exceedingly uniform lot, every one of which could be said to rank high in first-class company. They were models of the breed and were brought out in the pink of condition. Mr. Campbell's winner at the recent New York Show could hardly be improved upon as an ideal mutton sheep, and she was here placed first, and was closely followed by her mate of the same flock. Mr. Beattie was placed third with a well-fitted entry. Messrs. Hanmer showed a pair which would measure well up to the standard of excellence if judged for breed character, but were not highly enough fitted to win in a fat stock show. Mr. Campbell again led in ewe lambs, taking first and second money, but Messrs. Hanmer's lambs were close after them, and showed fine character. One of the closest contests in the Show was that in the section for yearling wethers between R. Gibson's New York winner and an imported sheep shown by Mr. Campbell. In this case the judges reversed the order, placing Mr. Campbell's entry first, but not without criticism, as the Gibson sheep had much the best back and was very firmly fleshed, though the other had a stronger neck and a better leg of mutton.

A string of twelve wether lambs made a very interesting display, being so nearly equal as to make it very difficult to select the winners. Mr. Gibson, however, found

himself possessed of the first and third prize lambs and Messrs. Hanmer had a good second. The first prize pen of three wether lambs was Mr. Gibson's, and they were a bonnie lot, as even as peas and plump to the hand.

Southdowns were the strongest class in the Show in point of numbers, and were right up to the standard in quality and condition. The exhibitors were John Jackson, Abingdon; T. C. Douglas, Galt; A. Simenton, Blackheath; Geo. Baker & Son, Simcoe; W. H. Beattie, Wilton Grove; A. Telfer & Son, Paris; and Thos. W. Smith, Glanford. Mr. Jackson scored first and second with yearling ewes, an excellent pair, showing fine breed type both in wool and mutton, but a good many onlookers thought the prizes might well have been reversed, although the contest was close One of the sensational features of the Show was the yearling wether in this class, shown by W. H. Beattie. He won first in his class and also the sweepstake prize for best sheep in the Show of any breed, grade, or age, in an uncommonly strong string of twenty-one, including the winners in all the other classes. This was an intensely interesting contest. The six judges composing the two sets were combined for this award. Two of the judges voted for Beattie's Southdown wether, two for Campbell's Shropshire ewe, and two for Kelly's Leicester ewe. Mr. Richard Gibson was called in to decide between these, and after a careful examination, gave his decision in favor of the Southdown wether. He was certainly a model mutton sheep, plump, firm and full in all his parts and fitted to perfection.

Dorsets were better shown on this occasion than in past years. There were only two exhibitors, Messrs R. H. Harding, Thorndale, and Jas. Bowman, Guelph, the latter exhibiting only three sheep, viz: a yearling ewe and two ewe lambs upon which he won third and fourth respectively. Mr. Harding's nine entries were good representatives of the breed, and were brought out in good flesh.

Hampshires and Suffolks were grouped together, the former being shown by John Kelly and John Rutherford, and the latter by W. J. Rudd, Eden Mills. Mr. Kelly's ewes in both sections were good specimens and well fitted. They won all but second prize in yearlings, which went to Mr. Rudd for a strong ewe.

Grades and Crosses. This was, as usual, one of the most interesting classes of the exhibition, being well filled in all its sections with ideal mutton sheep made up of a great variety of crosses, nearly all of which have resulted in the production of animals well fitted for the demands of the markets. The exhibitors were principally those which competed in the classes for registered sheep. The most successful entry in the class was the yearling wether shown by Gibson & Walker, a cross between Leicester and Lincoln, to which was awarded the first prize in his class and the sweepstake for best grade sheep any age under two years. He was a massive sheep, standing square on strong legs, with a strong, firm back, thickly fleshed and full in all parts. Amongst his strongest competitors were Campbell's Shropshire grade, Orr & Lillico's Leicester grade, and Kelly's Hampshire grade. The yearling ewes were a uniformly good lot, the first place being given to Campbell's entry, a Shropshire grade of fine quality, as was also Wright's ewe of the same cross, which won second prize. The sections for lambs were also well and worthily filled and placed, Mr. Campbell winning in both cases, followed closely by Orr & Lillico.

Swine.

The display in the Swine Department exceeded in numbers that of all previous years, but the average excellence as to quality and finish was, perhaps, hardly equal to that of 1895. While in the various classes many excellent and even superior animals were shown, a considerable percentage seemed to lack the fine fitting and finish that one expects to see at a fat stock show. In the older sections of the classes this year the maximum age was limited to under fifteen months, which accounts for the disappearance of the overgrown, unmarketable sort which we have been wont to see at such shows, and this may have left the impression that the exhibits in this department were not up to the standard for size; but we are satisfied to so limit the age was the proper thing, as the

market is calling for hogs of medium weight of a decided type and quality, and the breeders have wisely responded to the call by breeding and feeding to produce more nearly what is wanted.

Berkshires were shown by only two exhibitors, Messrs. J. G. Snell, Snelgrove, and John Kitching, Corwhin, who had but one entry. The Snelgrove string numbered 17 head, and comprised animals of uniform type, well up to the demands of the times, and brought out in fine condition. The first prize sow, "Snelgrove Belle," which also won the sweepstake for best sow of any age or breed, was a true model of perfection in the art of swine breeding, standing well on strong straight legs with good length of body, deep sides, well strung ribs, and ample heart girth, giving capacity for the display of the vital organs, and power to resist the encroachment of disease. The first prize barrow, "I X L," 4346, was placed second in the sweepstakes contest, the first prize being given to a Yorkshire barrow of exceptional merit, but many competent judges would have reversed the decision. The Berkshire presented a remarkably good side-view, being deep in his fore ribs and flanks, standing well on his legs, with first-class quality of bone, and firm flesh, smoothly distributed, his only failing being a slight deficiency in fulness of twist.

Yorkshires were out in stronger force than usual as to numbers, and some really good ones were shown, but the average was hardly up to former years. The exhibitors were Joseph Featherston, M P., Streetsville; J. E. Brethour, Burford; and Henry Deddels, Kossuth. The latter, a new exhibitor, made a very creditable showing with eight head of high class animals brought out in fine condition. His first prize barrow, "Waterloo Sweepstakes," proved also to be the sweepstakes barrow in competition with all breeds. He was a remarkably smooth and well proportioned hog with long, deep sides, a well proportioned body standing on strong and straight limbs, and having an attractive appearance, but was not so firm in flesh as could be desired and not hammed down to the hock as well as he might have been.

Chester Whites. The competition was between the well known herds of Wm. Butler & Son, Dereham Centre, and R. H. Harding, Thorndale, the former exhibiting ten head and the latter three, Butler & Son securing the best of the prizes. Their first prize sow, under 15 months, was an exceptionally good one, and Mr. Harding's barrows were well up in quality and condition.

Poland Chinas were shown by two exhibitors, W. & H. Jones, Mt. Elgin, and W. M. & J. C. Smith, Fairfield Plain. The class was strong in high-class individuals brought out in high condition, Jones' first prize sow, under fifteen months, being considered one of the best numbers in the Show, and the strongest competition with the Berkshire for the sweepstakes. She stood on very short legs and had great depth of body and depth and width of hams, and altogether was a model of the breed and of symetrical proportions. Messrs. Smith had the first prize barrows, and they were also very five specimens.

Tamworths. The exhibitors were H. George & Son, Crampton; A. C. Hallam, New Dundee; and Andrew Elliott, Galt. The exhibit on the whole was not equal to that of former years, although some very good specimens were shown. A pair of sows of apparently improved type were shown in the section under fifteen months, having shorter legs and snouts, but the judges concluded that they were not true to the established type of the breed, and they were placed lower on the list for this reason. Mr. Elliott showed three very large ones for their age in the competition for best offspring of one sow, and secured the first prize.

Duroc Jerseys were represented by drafts from the herds of Tape Bros., Ridgetown; and Wm. Butler & Son, Dereham Centre, and the class was well up to the standard, being filled in all its sections with worthy specimens of the breed. Tape Bros. had first and second prizes on barrows under nine months, on "Silverite" and "Gold Bug," very fine ones, and Butler & Son scored first on barrow over nine months, the other prizes being well distributed, Tape Bros. winning the majority.

Suffolks and Essex were grouped together and were shown by Joseph Featherston, M.P., Streetsville; and R Dorsey, Burnhamthorpe; the prizes were well distributed between the two exhibitors and breeds.

Grades and Crosses. The exhibitors in this class were John Kitching, Corwhin; Robert Agnew, Acton; J. G Snell, Snelgrove; W. & H. Jones, Mt. Elgin; Samuel Congdon, Everton; and Geo. Sleeman, Guelph. The exhibit on the whole was not equal to that of some former years in point of quality. In the section for barrow over nine and under fifteen months, J. G. Snell captured first prize on a Berkshire grade, and Mr. Agnew had a good second in a Yorkshire grade. Mr. Snell won first honors in both sections for sows, and Mr. Sleeman secured first and second for barrows under nine months.

It has been suggested that a new feature of interest might be added to the swine department by offering a prize in each class for a pork packer's pig of a certain weight and of a type required by the trade. This is a question for the consideration of the directors.

MEETING OF THE DIRECTORS.

A meeting of the directors of the Provincial Fat Stock Show was held in the Palmer House, Toronto, March 26th, 1897. Mr John I. Hobson was elected President and occupied the chair. The following directors were present:

From the Cattle Breeders' Association: John I. Hobson, J. C. Snell, and G. W. Clemons.

From the Sheep Breeders' Association: R. H. Harding, John Jackson, and D. G. Hanmer.

From the Swine Breeders' Association: Jos. Brethour, Geo. Green, and Andrew Elliott.

From the Dairymen's Association of Eastern Ontario: R. G. Murphy, and Henry Wade

From the Dairymen's Association of Western Ontario: Hon. Thomas Ballantyne, and Harold Eagle.

The report of the committee elected to visit places desirous of holding the next Provincial Winter Show was received. It was moved by J. E. Brethour, seconded by John Jackson, that the report of the committee be accepted. (Carried) The report is as follows:

REPORT OF COMMITTEE RE. LOCATION OF THE PROVINCIAL FAT STOCK AND DAIRY SHOW.

GENTLEMEN,—We, your committee appointed to visit and report upon the accommodation offered to this Association by Guelph, London, Brantford, Lindsay, etc., beg leave to report as follows: The first place we visited was

BRANTFORD.

Here we found one large skating rink, 140x90 feet, floor space 12,600 sq. feet. This building fairly well meets the requirements of the Provincial Winter Show, but is not as good as the Guelph building. Some distance from this building is situated a magnificent drill shed, which is dry and well lighted and is a most suitable building for our purpose were it large enough. It is 170x80 ft., floor space 14,280, making a total for the two buildings of 26,880 sq. ft. In the last named building are a number of splendid offices. These would in every way meet the requirements of our Association. We next visited

LONDON.

The building offered us here is on the Fair Grounds, and is within easy access of the street car track and the Grand Trunk freight and passenger switch. This building is 750x50 ft. and contains 37,500 sq. ft. of floor space. If this building is arranged as the city authorities say it shall be, it is well situated for the purpose for which we require it, both in size and other particulars.

LINDSAY

was next visited. This town has two large skating rinks, situated some distance apart, which have a combined floor space of 24,084 sq. ft. Both of these rinks are well situated near the center of the town and close to hotel and other accommodation. They are well lighted and contain ample room for offices, board rooms, etc. The accommodation at

GUELPH

is well known to the members of this Association. The available floor space is 23,838 square feet, and the offices all that can be desired. The city, the Board of Trade, and the Guelph Fat Stock Club offer the same inducements as heretofore.

The Secretary has received official letters from the Mayor of each of the above mentioned towns; these will be read to you to-day.

We beg to draw your attention to the following facts. In 1891, the year before the associations which are represented here to-day took part in the management of the Provincial Fair, there were 81 entries; the next year, the first in which we took an active part in controlling the show, there were 171; in 1893, 362; in 1893, 487; in 1895, 463; in 1896, 611. The total number of entries in 1896, including those for specials and sweepstakes, was 658. The increase between 1891 and 1892 was 111 per cent.; between 1892 and 1893, 112 per cent.; between 1893 and 1894, 35 per cent.; between 1895 and 1896, 32 per cent. This shows an average yearly increase of 72 per cent. for each of the last five years. Last year the building occupied by us at Guelph was over crowded; the aisles could not be kept free from feed and litter, therefore we did not receive as large gate receipts as we otherwise would. We cannot expect visitors to attend the Show when the building is continually over-crowded, and when it is impossible to view the exhibits with any degree of comfort. We, therefore, respectfully suggest that the accommodation provided for next year be at least 25 per cent. greater than that provided last year. We believe that there will be a larger exhibit at our next show of dairy cattle, of sheep, and of swine, than we have heretofore seen. This will be especially true if the Show is held at Guelph, Brantford or London.

Signed, { JNO. I. HOBSON, F. W. HODSON.

It was moved by GEO. GREEN, seconded by ANDREW ELLIOTT, that no deputations be received at this meeting. (Carried.)

HON. THOS. BALLANTYNE gave the following information concerning accommodation at Stratford: Stratford has a rink 220x100, and the annex 160x34; there are five rooms in connection, which can be used as committee rooms, and I am authorized to say that Stratford will pay all the expenses your Association may think necessary.

CONSTITUTION AND BY-LAWS.

The following constitution and by-laws were adopted, clause 7 not to come into force until 1898:

Preamble.

The object of this Association shall be:

To unite the efforts of the bodies hereafter named, when such a course is deemed desirable.

To conduct, or assist in conducting, exhibitions of Live Stock, Poultry, Dairying, Horticulture, Agriculture, and Apiculture; also their products, implements and supplies.

To conduct annual sales or other undertakings of Provincial interest, which can be best accomplished by a union of the bodies interested.

Constitution.

1. This Association shall be called the "Central Agricultural Association of the Province of Ontario."

2. The Minister of Agriculture of the Province of Ontario shall at all times be Honorary President of the Central Agricultural Association.

Membership.

3. The membership of the Central Agricultural Association shall consist of the President and Secretary, or one or more members elected at a board meeting of each of the following associations:

Dominion Horse Breeders' Association.
Dominion Cattle Breeders' Association.
Dominion Sheep Breeders' Association.
Dominion Swine Breeders' Association.
Poultry Association of Ontario.
The Cheese and Butter Association of Eastern Ontario.
The Cheese and Butter Association of Western Ontario.
The Entomological Society of Ontario.
The Ontario Bee-Keepers' Association.
Ontario Fruit Growers' Association.
The Ontario Agricultural College.

And such other Provincial Associations as may be from time to time recommended for membership by the Ontario Department of Agriculture.

By-Laws.

4. The Secretary of each affiliated body is hereby requested to forward to the Secretary of the Central Agricultural Association the name and address of the officers and members who represent said body, on or before the first day of March of each and every year.

5. Other associations not mentioned in clause 3 may, by vote of the members of the Central Agricultural Association present at any general meeting, be allowed representation for the year then current. Members so elected shall enjoy all the privileges and powers possessed by other members. In a similar way the number of delegates from any society may be fixed.

6. The expenses of members of the Central Agricultural Association shall be paid by the body they respectively represent, except in the case of executive officers, whose expenses, when acting in an executive capacity, shall be paid out of the funds of the Central Agricultural Association when said funds are available; but when said funds are not available, the expenses of the executive shall be paid by the bodies represented when said executive officers were elected, each body paying an equitable proportion.

When so declared by vote of the members of the Central Agricultural Association, the executive officers may be paid for services rendered, this sum to be provided as in the case of their expenses.

Voting.

7. At general meetings and at committee meetings all questions shall be decided by a majority of votes cast, except in the case of money grants and the selection of a location at which to hold the Provincial winter show. In such cases each association shall be entitled to cast one vote for each $50 given or collected by said association towards the prize list or expenses of the current show.

Executive Committee.

8. The executive committee shall consist of the President, Vice-President, the Secretary-Treasurer and one or more members elected each year at the first meeting of the members.

9. The executive committee shall carry into effect the plan of work decided on by the members, and shall arrange the details of the same.

OTHER COMMITTEES.

10. Other committees may be appointed each year, at the first or at subsequent meetings of the Central Agricultural Association from among the members or otherwise.

Each committee shall have power to add to its number, from among the members or otherwise, when by so doing better work can be accomplished.

The expenses of each member of each committee shall be borne by the association which said member represents, except in the case of members of the executive.

ANNUAL MEETING.

11. At the annual meeting each year, the President, Vice-President, the executive committee, and other committees, and an auditor, shall be elected.

12. The members shall, at the first meeting of the Association, and afterwards when necessary, appoint from among themselves or otherwise, a Secretary-Treasurer, who shall remain in office during pleasure.

13. Members shall make such suggestions as they may deem necessary for the benefit of the Association, look after the general interests of the same, and attend to such duties as the executive may require.

14. At each annual meeting the retiring executive officers shall present a full report of their proceedings, and of the proceedings of the Association, and a detailed statement of the receipts and expenditures for the previous year, and of assets and liabilities; and a copy of said report, a statement of receipts and expenditure, a list of members, and the list of officers elected, and also such general information on matters of special interest to this Association as the officers may have been able to obtain, shall be sent to the Minister of Agriculture within forty days after the holding of such annual meeting.

15. This Association shall hold a meeting or meetings each year on such date or dates as the Executive may decide.

16. The Association year shall be the calendar year.

DUTY OF OFFICERS.

President.

17. It shall be the duty of the President to preside at all meetings of the Association, decide all questions of order, and make any suggestion he may deem necessary in the interest of the Association.

Vice-President.

18. It shall be the duty of the Vice-President to assist the President. In the absence of the President the powers and duties of the President shall devolve on the Vice-President.

Secretary-Treasurer.

19. It shall be the duty of the Secretary-Treasurer to attend all meetings of the Association, the officers and the Executive, and keep correct minutes of the same; conduct all correspondence, and issue all press and other reports; also to prepare for publication the annual report. As Treasurer, he shall receive and account for all moneys belonging to the Association; pay all bills and accounts that have been approved by the Executive. He shall have the power of Managing Drector, acting under the control and with the approval of the Executive.

20. By virtue of his office he shall be a member of each committee appointed.

21. Before entering upon the duties of his office, he shall enter into a bond, with security when required, which shall be approved by the Executive Committee.

General.

22. It shall be the duty of each member to support at all times the ruling of the majority, whether at the annual meeting or at an Executive meeting, his own opinion to the contrary notwithstanding.

23. No member shall disclose motions, rulings, names of movers, seconders, etc., provided the meeting rules that such data shall not be made public, nor shall any officer furnish newspaper reports at variance with the official report.

24. The person whose name is placed first on a committee shall be chairman of that committee. It shall be his duty to call the committee together, and to do all in his power to conduct successfully the work for which the committee is appointed.

QUORUM.

25. (1) Not less than five members shall be a quorum to transact business for the Association. Not less than three members shall be a quorum at an executive meeting.

(2) Any member not present at a meeting, if he send his views in writing, shall be considered as present.

(3) The members of the Executive, or of any committee, may conduct by correspondence the duties assigned to said officers, Executive or committee, by the constitution or by-laws, or by the Association, when such a course is deemed advisable by said officers, Executive, or committee.

Notice of Meetings.

26. At least two weeks' notice shall be given of each annual or general meeting, naming time and place of meeting. Notice may be given through the public press or by a circular letter mailed to each member.

27. An Executive meeting shall be called by mailing at least one week before the date of meeting to each officer a notice of meeting as above provided.

28. A members' meeting, or an Executive meeting, may be held on shorter notice, provided each member or executive officer (if an Executive meeting) is otherwise notified and consents thereto.

Proxy Votes.

29. A member not present may vote by proxy, but all proxies before being used must be signed by the party represented, and countersigned by the Secretary. Before signing a proxy, the Secretary shall examine the signature affixed. If he believes it to be genuine, he shall sign it; if he has reason to doubt its genuineness, he shall require evidence before doing so.

Misrepresentations.

30. The Executive Officers, on being made aware of any fraud having been committed by a member or exhibitor in the entry of any stock or goods in competition for prizes, shall, if they control the exhibition or department, withhold the payment of any prizes that may have been awarded by the judges to said member or exhibitor on such fraudulent or other entries made by any such exhibitor. The money thus withheld shall not remain in the hands of the Association, but prizes shall be awarded as though said exhibitor had not shown. Said exhibitor may also be excluded from exhibiting any stock or goods at exhibitions controlled by this Association for a period of four years.

31. To facilitate a redistribution of awards in case any exhibitor should forfeit his prize or prizes, as provided in section 30, there shall be added to each section of the prize list, in addition to the usual cash prizes, the reserve honorary numbers, "Highly Commended" and "Commended."

Exhibitions.

32. Exhibitions shall be governed by the rules and regulations recommended by the various associations interested and approved of by this society

33. All propositions made to this Association on behalf of any other body or society, must be presented in writing.

34. Before commencing an undertaking of a Provincial character, there shall annually be a written agreement setting forth, in detail, the terms on which the enterprise shall be conducted. The members representing each body which takes part in said venture shall sign said document, and said signatures shall bind the bodies so represented and the delegates individually, to the faithful fulfilment of their part of the agreement; but neither they nor their society shall be responsible for the promises or agreements of any other society than the one they represent.

35. The delegates of each Association represented shall conduct or assist in conducting the respective departments to which said Association grants money to be given in prizes. If any society grant all the money offered in a department, said society, together with the Executive of this Association, shall have full control of said department. But if the prize money in any department is provided by several societies, each of which is represented on the Board of the Central Agricultural Association, said societies shall be equitably represented on the committee in charge of the department, according to the money granted to said department.

36. In case all the prize money offered in any department is not won by the exhibitors, said money shall be returned to the society which granted it; but if one or more societies or individuals grant money to said department, the money not won shall be returned to each society or individual in proportion to the amount subscribed by each society or individual.

37. The receipts of the Central Agricultural Association obtained in connection with the Provincial Winter Show shall be pooled.

38 The expenses in connection with the Provincial Winter Show and the expenses of the Executive shall first be paid out of the receipts, and if a balance remain it shall be equitably divided in same manner as set forth in clause 36, between the societies which subscribed towards the prize list.

39. If the receipts do not meet the expenses, each Association which subscribed to the prize list shall pay an equitable proportion of the balance.

Additions and Amendments.

40. Any additions or amendments to the constitution or by-laws shall be presented in writing at a meeting previous to the adoption of the same, and shall require a two-thirds majority of the members present to pass.

ORDER OF BUSINESS.

(1) Reading minutes of previous meeting.
(2) Address and reports of officers.
(3) Reports of committees.
(4) Unfinished business.
(5) New business.
(6) Addresses and discussions.
(7) Opening of question drawer.
(8) Election of officers.
(9) Adjournment.

The above order of business may be replaced by another provided by the President or Executive.

ORDER OF MEETINGS.

(1) Except by permission of the presiding officer, no member or other person shall speak, except to ask a question, or to introduce or speak to a motion.

(2) In the discussion following the introduction of a subject, no person shall speak more than twice, nor for a longer time than five minutes, except by a vote of the meeting.

(3) When a question is under consideration no motion shall be in order, except the following: (1) To adjourn; (2) to postpone; (3) to amend. These motions take precedence in the order named, and the first two shall be decided without debate.

(4) Before the vote is taken on any motion or amendment, the President shall ask: "Is the meeting ready for the question?" The motion shall not be put so long as any member desires to speak and is in order. Any member desirous of asking a question on the subject introduced may do so verbally; put if he desires to ask more than two questions, he must submit them to the Secretary in writing.

ELECTION OF OFFICERS AND COMMITTEES.

It was moved by Hon. THOS. BALLANTYNE, seconded by G. W. CLEMONS, that J. C. Snell be Vice-President. (Carried.)

It was moved by JOHN JACKSON, seconded by GEO. GREEN, that F. W. Hodson be Secretary-Treasurer. (Carried.)

It was moved by GEO. GREEN, seconded by R. H. HARDING, that J. E. Brethour be the representative from the Swine Breeders' Association on the Executive Committee. (Carried.)

It was moved by R H. HARDING, seconded by D. G. HANMER, that John Jackson be the representative from the Sheep Breeders' Association on the Executive Committee. (Carried.)

It was moved by J. C. SNELL, seconded by F. W. HODSON, that G. W. Clemons be one of the Executive Committee. (Carried.)

It was moved by D. G. HANMER, seconded by Hon. THOS. BALLANTYNE, that the Programme Committee be the same as the Executive Committee. (Carried.)

It was decided that the committee on cattle, sheep, and swine be the representatives from these Associations respectively.

Dairy Committee:—G. W. Clemons, H. Wade, Geo. Wheatly, R. G. Murphy, Harold Eagle, and R. M. Ballantyne.

Judges for the Dairy Committee:—G. E. Day, R. G. Murphy, and J. C. Snell.

It was decided by the Dairy Committee to divide the classes for Jerseys and Guernseys in the Dairy Department.

LOCATION OF THE SHOW.

It was moved by Hon. THOS. BALLANTYNE, seconded by ANDREW ELLIOTT, that Stratford be considered one of the places applying for the Show. (Carried.)

It was moved by JOHN JACKSON, seconded by J. E. BRETHOUR, that the vote regarding the location of the Show be taken by ballot, the place receiving the lowest number of votes on each ballot to be dropped; as soon as any place has a majority of votes over all the others that place to be declared chosen. (Carried.)

Brantford was selected on the second ballot as the place for holding the Show this year.

It was decided that the Show be held on the 7th, 8th and 9th of December.

It was moved by HENRY WADE, seconded by J. E. BRETHOUR, that the special prizes be arranged by the Executive Committee. (Carried.)

It was moved by D. G. HANMER, seconded by R. G. MURPHY, that Messrs. Day and Reynolds be representatives from the Ontario Agricultural College to the Board of this Association. (Carried.)

The rules and regulations and the prize list for 1897 are published on pages 111 to 118.

MEETING OF THE EXECUTIVE.

A meeting of the Executive of the Provincial Fat Stock and Dairy Show Association was held at the Kerby House, Brantford, on the 21st of May, at 7.30 p.m., the President, Mr. JOHN I. HOBSON, in the chair. There were present Messrs. John I. Hobson, J. C. Snell, Arthur Johnston, G. W. Clemons, J. E Brethour, R. H Harding, Jas. Tolton, John Jackson, D. G. Hanmer, Geo. Hately, H. A. Foulds, Duncan McEwen, C. W. Yapp, and F. W. Hodson.

Moved by G. W. CLEMONS, seconded by F. W. HODSON, that all present be added to the Executive for this meeting. (Carried.)

Moved by R H. HARDING, seconded by JOHN JACKSON, that all meetings be held in the same order as last year. (Carried)

SPECIAL PRIZES

Prize offered by the Goold, Shapley & Muir Co. to be awarded for best animals, any breed, age, or sex, exhibited in Cattle Department.

Prize offered by the Wilkinson Plow Company to be awarded for best sheep exhibited at the Show. (Carried.)

Prize offered by Thom's Implement Works to be awarded for best animal exhibited in Swine Department. (Carried.)

Prince of Wales' Prize to be given in the Dairy Department. (Carried.)

Moved by D. G. HANMER, seconded by J. C. SNELL, that the awarding of this prize be left to the committee of Messrs. Snell, Clemons, and Hately. (Carried)

The committee decided that the prize should be awarded as follows: Sweepstake for cow under thirty-six months $30. Sweepstake for cow thirty-six months and over $18.

Prize offered by the Ingersoll Packing Co. to be awarded for three best singers bred by exhibitor. (Carried.)

Moved by J. E. BRETHOUR, seconded by R. H. HARDING, that we do not accept the Southdown prizes. (Lost.)

Moved by J. E. BRETHOUR, seconded by D. G. HANMER, that Messrs. C. C. L. Wilson, Ingersoll; Chester Fearman, Hamilton; and J. W. Flavelle, Toronto, be the judges for the bacon sections in each class. (Carried.)

PRINTING.

After arranging for cards, ribbons and local advertising, it was decided that all printing be given to parties sending in lowest tenders.

Moved by A. JOHNSTON, seconded by R. H. HARDING, that J. E. Brethour, D. G. Hanmer, and the Secretary be a committee to prepare an agreement with Brantford. (Carried.)

Messrs. Geo. Hately and H. A. Foulds were appointed a committee to arrange local men on the committees.

Reception Committee: John I. Hobson, President Provincial Fat Stock Show Association; His Worship Mayor Elliott; E L. Gould, President of the Board of Trade; T. H. Preston, President Southern Fair Board; Arthur Johnston, and F. W. Hodson, Secretary Provincial Winter Fair Association.

Moved by JOHN JACKSON, seconded by J. E. BRETHOUR, that D. G. Hanmer be Superintendent. (Carried.)

The Secretary and the Superintendent were appointed a committee to engage assistants.

Moved by A. JOHNSTON, seconded by J. C. SNELL, that Richard Gibson be appointed official reporter for the Show. (Carried)

MEN TO TAKE CHARGE OF RINGS IN THE DIFFERENT DEPARTMENTS.

Cattle:—The President and G. W. Clemons.

Sheep:—Jas. Tolton and John Jackson.

Swine:—G. B. Hood and Arthur Johnston.

Moved by JOHN JACKSON, seconded by JAS. TOLTON, that the President, Secretary, Superintendent, and Geo. Hately be the sub-Executive Committee or Committee of Management. (Carried.)

Poultry Committee: Geo. Wright and Duncan McEwen.

RULES AND REGULATIONS.

Moved by GEO. GREEN, seconded by JOHN JACKSON, that pedigrees or certificates be produced at time of judging. (Carried)

Moved by ARTHUR JOHNSTON, seconded by G. W. CLEMONS, that the clause *re* younger sections in each class be struck out. (Carried.)

It was decided that exhibitors and assistants be allowed three admissions each day.

MEMORANDUM OF AGREEMENT

Between the Central Agricultural Association of the Province of Ontario herein called "the association" of the first part; and the Corporation of the City of Brantford, in Ontario, herein called "the Corporation," of the second part.

Whereas it is agreed between the parties hereto that the Provincial Winter Show shall be held in the City of Brantford in Ontario on the 7th, 8th and 9th days of the month of December next, 1897. And whereas in consideration of the said Association agreeing so to hold the said show the party of the second part has agreed to provide the necessary buildings and accommodations therefor as herein provided.

And whereas the Municipal Council of the said corporation has by resolution authorized the Mayor to execute these presents :

Firstly. The Corporation agrees to provide free of all charge or cost to the Association, and set apart for the sole and entire use of the Association as and for the necessary stables and exhibition building for live stock, a building or buildings of the full size of at least thirty thousand square feet of floor area independent of office room, and in case such floor area shall be deemed by the Executive Committee of the Association to be insufficient for the purposes of the Association as aforesaid, the corporation will at once upon notice thereof, set aside or provide such additional stables or buildings as may be required by the executive, in such manner as the said Executive Committee of the Association shall require. The said building or buildings shall be well lighted both by day and night and shall be supplied throughout at all time with an ample supply of good water conveniently located, also with all necessary stalls and pens and with sufficient hurdles to properly enclose the animals in pens of suitable size, also with ample feeding troughs or mangers for each pen or stall, also with sufficient good clean straw to bed all the animals and keep them clean during all the time from the arrival of the animals until the show shall be ended.

All of the said building or buildings and the furnishings and articles enumerated as required shall be properly prepared and clean and ready for occupation and use, as herein provided, by the evening of Friday, the third day of December, 1897, and from that date until the Show shall be ended.

Secondly. The said Corporation also agree to provide free of all charge or cost to the Association four separate offices and a board room for holding the annual or other meetings of the different Associations which may be held during or immediately subsequent to the said Show ; said offices and board room having been shown to committee when on tour of inspection in Brantford. And also a suitable building for the holding of a public meeting, as and when required ; all offices in buildings and board room mentioned in this paragraph to be comfortably and sufficiently furnished, seated, heated and lighted both by day and night if required.

And it is further provided that the Executive Committee of the Association or the committee or the directors managing the said show shall be the absolute and sole judges as to the quantity, quality and sufficiency of any and all of the accommodations, furnishings or materials to be supplied under this agreement. And in the event of any of such being considered insufficient from any cause soever the said committee or directors shall at once notify the representatives of the City of Brantford, and in the event of they not providing the necessary accommodation or articles mentioned, then the directors shall be at liberty to obtain and supply such accommodations or materials or any substitute therefor, and all expense and costs sustained by the said Association, directors or committee in connection therewith, the corporation hereby covenants and agrees forthwith to repay to the said Association.

In witness whereof the hand of the secretary of the said Association and the Corporate Seal of the said corporation and the hand of the Mayor thereof have hereunto been set this twenty-seventh day of July in the year 1897.

In the presence of

(Signed)
H. F. Leonard.

(Signed)
A. P. Westervelt.

(Signed)
Thos. Elliott,
Mayor. Seal.

(Signed)
F. W. Hodson,
Secretary.

THE ONTARIO PROVINCIAL FAT STOCK AND DAIRY SHOW

DECEMBER 7th, 8th and 9 h, 1897.

RULES AND REGULATIONS.

GENERAL RULES.

1. Entries should be made on or before November 25th by application to the Secretary, who will furnish blank applications on which to specify exhibitor's name and address, with age and description of animals offered. Entries received by the Secretary after November 25th will be charged double fees. No entries will be received after December 3rd.

2. A card will be furnished the exhibitor at the time of making the entry, specifying the class, the number of the section and the number of the entry, which card must remain attached to the animal during the exhibition ; but in the case of sheep, pigs and poultry the card shall be attached to the pen or coop.

3. No animal shall compete for a sweepstake or special prize that has not been shown in a regular class, or is eligible to be shown in such a class.

4. Diligence will be used by the officers of the board to prevent injury to or loss of property, but they will not be responsible for any loss or damage that may occur.

5. Each animal must be shown in the section of the class to which it belongs.

6. All animals must remain in the ring for a few minutes after prizes are awarded, and the public given an opportunity to examine them.

7. Pedigrees of all animals, with the exception of steers, must be produced in the show ring. In the case of steers the breeders' certificate, certified to by the Secretary of the Record for the breed, must be produced. This certificate must contain the name and record number of both sire and dam.

8. General rules will apply to each department.

9. The exhibition will open at 8 a m., December 7th, and close at 12 midnight, December 9th, 1897. The exhibitors will be allowed to remove animals after 12 o'clock (midnight) on the 9th inst. Admission will be charged until 12 o'clock (midnight) of the 9th inst.

RULES GOVERNING CATTLE DEPARTMENT.

1. All cattle shown in the pure-bred classes must be recorded in the Canadian records, or in reputable English or American Records, or the dam and sire must be recorded. (See rule 2.)

2. The following fees will be charged and must accompany application for entry, for which accommodation will be provided ; for each entry $1.50. Entries for each special and sweepstake $1 50 per entry.

In the case of pure-bred animals the name of the breeder and the name, age and record number of the animal must be given at the time of making the entry, if the animal is recorded ; if not recorded, the name of the breeder and the name and age of the animal must be given at the time of making the entry, also the name and record number of the sire and dam. No entry will be accepted unless this data is complete.

3. Cattle brought to the show but not entered, will not be allowed to compete, but will be charged $2 per head.

4. Each exhibitor of cattle must be a member of the Dominion Cattle Breeders' Association.

5. A catalogue will be published and numbers corresponding with those in the catalogue will be furnished exhibitors on their arrival. These numbers must be attached to the animals during the entire time of the exhibition.

RULES GOVERNING SHEEP DEPARTMENT.

1. Each sheep shown in the pure-bred classes must be recorded in Canadian Records, or in reputable English or American Records, and shall be labelled with the Association Tag.

2. All sheep shown in this department shall be American or Canadian bred.

3. The following entrance fees will be charged, and must accompany each application for entry for which accommodation will be provided : For each entry 50c ; entries for each special and sweepstake 50c.

In the case of pure-bred sheep, the name of the breeder and the name, age and record number of the animal must be given at the time of making the entry. No entry will be accepted unless this data is complete.

4. Animals brought to the Show but not entered, will not be allowed to compete, but will be charged $1.00 per head.

5. Each exhibitor of sheep must be a member of the Dominion Sheep Breeders' Association.

6. A catalogue will be published and numbers corresponding with those in the catalogue will be furnished exhibitors on their arrival. These cards must be carried into the ring by the person in charge of each exhibit, and must afterwards be attached to the pen containing the animal.

Rules Governing Swine Department.

1. All swine shown in pure-bred classes must be registered in Canadian Records.

2. All swine shown in this department shall be American or Canadian bred.

3. The following entrance fees will be charged, and must accompany application for entry, for which accommodation will be provided: For each entry 50c.; entries for specials and sweepstakes 50c. per entry.

In the case of pure bred animals, the name of the breeder and the name, age and record number of the animal must be given at the time of making the entry. No entry will be accepted unless this data is complete.

4. Animals brought to the show but not entered, will not be allowed to compete, but will be charged for space $1.00 per head.

5. Each exhibitor of swine must be a member of the Dominion Swine Breeders' Association.

6. A catalogue will be published and numbers corresponding with those in the catalogue will be furnished exhibitors on their arrival. These cards must be carried into the ring by the person in charge of each exhibit, and must afterwards be attached to the pen containing the animal.

Rules Governing Dairy Department.

1. All cattle shown in the pure-bred classes must be recorded in Canadian Records, or in reputable English or American Records.

2. The following fees will be charged and must accompany application for entry, for which accommodation will be provided; for each entry $1.50; entries for each special and sweepstake $1.50 per entry.

In the case of pure bred animals the name of the breeder and the name, age, and record number of the animal must be given at the time of making the entry.

3. Each exhibitor of cattle must be a member of the Dominion Cattle Breeders' Association.

4. Cows must all be giving milk, and the awards shall be made by the following scale:

20 points for constitution and conformation.
1 point for each pound of milk.
20 points for each pound of fat.
4 points for each pound of solids (not fat.)
1 point for each 10 days in milk, after the first 20 days. (Limit 200 days)

10 points shall be deducted from the total score for each per cent. of fat below three per cent. of fat in the milk.

5. The milking competition shall extend over 48 hours, and will take place on Tuesday and Wednesday, December 7th and 8th. Rations fed to competing cows will not be considered. Exhibitors may have the privilege of milking their cows twice or three times during each day. When the cows are to be milked only twice each day, they shall be milked dry in the presence of the judges at 6 on the evening of December 6th, and the test will conclude at 6 p.m. on December 8th. When the cows are to be milked three times during each day, they shall be milked dry in the presence of the judges at 9 p m on the evening of December 6th, and the test will conclude at 9 p.m. on December 8th. The percentage of fat in the milk will be determined by the Babcock Milk Tester, and the percentage of solids (not fat) will be determined by ascertaining the specific gravity of the milk and then estimating the amount of solids (not fat) by the use of the authorized formula for that purpose.

6. Exhibitors will be held responsible for the safe keeping of their cows during the test.

7. All stock must be in the stalls not later than 2 p.m., Monday, December 6th. (See Clause 2 under Animals.)

A catalogue will be published and numbers corresponding with those in the catalogue will be furnished exhibitors on their arrival. These numbers must be attached to the animals during the entire time of the exhibition.

Animals.

1. No animals shall be removed until the close of the exhibition.

2. All stock, other than that competing in the dairy classes, must be in the stalls or pens on Tuesday, December 7th, at 1 o'clock, p m. Stock competing in the dairy classes must be in the stalls not later than 2 p m. December 6th, but if the owners desire it, they may be brought Saturday, December 4th. Preparations will be completed Friday, December 3rd.

3. Cattle must be well halter broken. No vicious animal will be admitted.

4. The age of all animals to be computed to the 1st of December.

Awarding Committees.

1. Awarding committees will consist of two judges and a reserve judge for each class or classes.

2. Awarding committees will commence examination on the 2nd day of the Show, at 10 30 o'clock, and continue until awards are completed.

3. No person shall act as judge of any lot in which he may be interested as an exhibitor, the agent or employee of an exhibitor or otherwise.

4. All animals, except those exhibiting in the dairy classes, shall be judged from a consumer's standpoint. The awards shall be given to the animal most valuable from a consumer's point of view.

5. No animal deemed unworthy shall be awarded a premium, but no premium shall be withheld merely because there is no competition.

6. In case of protest, notice must be given to the Secretary before or during the examination of the animal or article protested, or within four hours after the close of said examination, a written statement setting forth the reason for protesting, must be filed with the Secretary on the day the notice is given, and a deposit of $5 left with the protest, and forfeited if the protest is not sustained.

7. Any exhibitor who shall tear off a premium, card or ribbon, or authorize another to do so in the presence of the judges, or shall otherwise insult the judges, shall forfeit the premium and be excluded from competition.

8. In all cases where protests are entered for improper or malignant purposes, the board shall exclude the party protesting from exhibition for two years thereafter.

9. Judges are instructed that if they have good reason to believe that an exhibitor, by false entry or otherwise, attempts to deceive the committee or the public, and obtain an award by misrepresentation, they shall report the fact at once to the Secretary, who shall report the same to the directors who may expel such exhibitor for fraud for at least two years, and may withhold all or any prizes awarded to said exhibitor.

10. The entry books must be returned by the judges of each department to the Secretary as soon as the awards in each are completed.

11. Great care must be exercised to preserve the judges' books, and the awards must be entered as above in a plain, legible manner, in the proper place, as the premiums will be paid on the authority of these entries ONLY.

12. Judges will be particular to observe the following: Red Ribbons are destined for first premiums; Blue Ribbons for second premiums; White Ribbons for third premiums; Green Ribbons for fourth or highly commended; Yellow Ribbons for fifth or commended.

13. Decisions of judges shall be final, and no appeal will be considered except in cases of fraud or protest.

14. Objections to a person serving as judge must be submitted to the Secretary in writing not later than November 7th, 1897, and give good and sufficient reasons therefor.

15. Any exhibitor attempting to interfere with judges during their adjudications will be promptly excluded from competition.

Superintendent.

The superintendent shall be subject to the Executive Committee. He shall have charge of the building, caretaker, etc. He will designate the hours of feed, forage, and bedding for animals on exhibition, which can be obtained on application to him at reasonable rates. Stalls and pens shall be cleaned before eight o'clock and kept clean until 10 p.m. each day of the Show. The aisles and passages shall be kept clean and unincumbered. Feed or bedding shall not be placed in the aisles or littered about the building, but all parts thereof shall be kept scrupulously clean and tidy.

Admission Fees.

Tickets admitting gentlemen, 25c.; ladies, free; boys, under twelve years, 10c.

PRIZE LIST.

All stock must be in the proper stalls or pens not later than 1 .m., Tuesday, December 7th.

CATTLE.

Class 1.—Shorthorns.

Sec.

1. Steer, 2 years and under 3; prizes, 1st $20, 2nd $15, 3rd $10, 4th Highly Commended, 5th Commended.
2. Steer, 1 year and under 2; prizes, 1st $20, 2nd $15, 3rd $10, 4th Highly Commended, 5th Commended.
3. Steer, under 1 year; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
4. Cow or heifer, 3 years and over; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
5. Heifer, 2 years and under 3; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
6. Heifer, under 2; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
7. Prizes awarded in Sections 1, 2 and 3 will be duplicated by the Dominion Shorthorn Breeders Association.

CLASS 2.—HEREFORDS AND POLLED ANGUS.

Sec.
1. Steer or heifer, two years and under 3; prizes, 1st $20, 2nd $15, 3rd $10, 4th Highly Commended, 5th Commended.
2. Steer or heifer, 1 year and under 2; prizes, 1st $20, 2nd $15, 3rd $10, 4th Highly Commended, 5th Commended.
3. Steer or heifer, under 1 year; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
4. Cow or heifer, 3 years and over; prizes, 1st, $20, 2nd $15, 3rd $10, 4th Highly Commended, 5th Commended.

CLASS 3.—GALLOWAYS AND DEVONS.

Sections and prizes same as in Class II.

CLASS 4.—GRADES OR CROSSES OF ANY BREED.

Sec.
1. Steer, 2 years and under 3; prizes, 1st $25, 2nd $20, 3rd $10, 4th Highly Commended, 5th Commended.
2. Steer, 1 year and under 2; prizes, 1st $20, 2nd $15, 3rd $10, 4th Highly Commended, 5th Commended.
3. Steer, under 1 year; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
4. Cow or heifer, 3 years and over; prizes, 1st $20, 2nd $15, 3rd $10, 4th Highly Commended, 5th Commended.
5. Heifer, 2 years and under 3; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
6. Heifer, under 2 years; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
7. Prizes in the first 6 Sections of Class 4, won by Grade Herefords, sired by a registered Hereford bull (name and number of bull to accompany entry) will be increased 25 per cent. by H. D. Smith of Compton, Que.
8. Special by the Dominion Shorthorn Breeders' Association for best Grade Steer, sired by a pure bred Shorthorn bull, $20.

CLASS 5.—CHAMPIONSHIP PRIZE.

Sec.
1. *For best animal shown in the Cattle Department.* Prize, a "Maple Leaf" Grain Grinder donated by Goold, Shapley & Muir Co., Brantford, Ont.
2. If the above prize is won by a pure-bred Hereford or Hereford Grade, $25 additional will be donated by the Canadian Hereford Breeders' Association.
3. If this prize is won by a Hereford or Grade Hereford with at least two registered crosses, $50 extra will be donated by H. D. Smith, Esq., Compton, Que.

SHEEP.

CLASS 6.—COTSWOLDS.

Sec.
1. Ewe, 1 year and under 2; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5 Commended.
2. Ewe, under 1 year; prizes, 1st $12, 2nd $8, 3rd $6, 4th Highly Commended, 5th Commended.
3. Wether, 1 year and under 2; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
4. Wether, under 1 year; prizes, 1st $12, 2nd $8, 3rd $6, 4th Highly Commended, 5th Commended.
5. 3 Wethers, under 1 year; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.
6. 3 Ewes, under 1 year; prizes, 1st $15, 2nd $10, 3rd $5, 4th Highly Commended, 5th Commended.

CLASS 7.—LINCOLNS.

Sections and prizes same as in Class 6.

CLASS 8.—LEICESTERS.

Sections and prizes same as in Class 6.

CLASS 9.—OXFORDS.

Sections and prizes same as in Class 6.

CLASS 10.—SHROPSHIRES.

Sections and prizes same as in Class 6.

CLASS 11.—SOUTHDOWNS.

Sections and prizes same as in Class 6.

CLASS 12.—DORSET HORNS AND MERINOS.

Sec.
1. Ewe, 1 year and under 2; prizes, 1st $12, 2nd $8, 3rd $4, 4th Highly Commended, 5th Commended.

2. Ewe, under 1 year. Prizes: 1st, $12; 2nd, $8; 3rd, $4; 4th, highly commended; 5th, commended.
3. Wether, 1 year and under 2. Prizes: 1st, $12; 2nd, $8; 3rd, $4; 4th, highly commended; 5th, commended.
4. Wether, under 1 year. Prizes: 1st, $12; 2nd, $8; 3rd, $4; 4th, highly commended; 5th, commended.

CLASS 13.—HAMPSHIRES AND SUFFOLKS.

Sections and prizes same as in class 12.

CLASS 14.—SWEEPSTAKE.

For the Best Sheep Exhibited at the Show.

A plow donated by the Wilkinson Plow Co., Ltd., Toronto. (The winner to choose any walking plow made by this company.)

CLASS 10A.—SHROPSHIRE SPECIALS.

Prizes offered by the American Shropshire Record Association:

Sect.
1. Grand sweepstakes premium of the Show, if won by registered Shropshire sheep, $50.
2. Best registered Shropshire wether, 1 year old and under 2. First premium, $10; 2nd, $5.
3. Best registered Shropshire wether, under 1 year old. First premium, $10; 2nd $5.
4. Best three registered Shropshire wether lambs. First premium, $10; 2nd, $5.
5. Extra special premiums for best wether, sired by registered Shropshire ram out of grade ewes, 1 year old and under 2. First premium, $10; 2nd, $5
6. Under 1 year old. First premium, $10; 2nd, $5.

These prizes are offered subject to the following conditions:

Sheep competing must be American bred, and owned at least ten days before showing by exhibitor.

Sheep and lambs competing for these prizes must be recorded in the American Shropshire Registry Association Record, and bear ear tag of breeder in one ear and the Association tag with registered number in the other.

Any sheep or lamb having won an Association prize at a show, shall be ineligible to compete for the Association prize at any other show except Provincial Fat Stock Show, Madison Square Garden Show, and Chicago Fat Stock Show.

All prizes shall be paid by the Secretary of the American Shropshire Association to exhibitors ONLY upon presentation of certificates from the secretaries of fairs, giving names and association numbers of sheep that have won.

Judges are requested to make an entry in their books of the numbers of every winning sheep and lamb.

CLASS 11A.—SOUTHDOWN SPECIALS.

Special premiums offered by the American Southdown Breeders' Association.

The first five volumes of the American Southdown Record for pen of "four lambs," *two rams and two ewes*, bred and owned by exhibitor.

This premium is offered conditioned:

1. That the animals competing for said premium shall be recorded in the American Southdown Record prior to date of making entry for exhibition, and that the party making the entry shall furnish the secretary of the American Southdown Breeders' Association, at the time of entry, a copy of the same.

2. That the premium will be paid on the presentation of certificate from the proper officer of the fair.

CLASS 15.—GRADES AND CROSSES.

Sect.
1. Ewe, 1 year and under 2. Prizes: 1st, $12; 2nd, $8; 3rd, $4; 4th, highly commended; 5th, commended.
2. Wether, 1 year and under 2. Prizes: 1st, $12; 2nd, $8: 3rd, $4; 4th, highly commended; 5th, commended.
3. 3 Wethers, under 1 year. Prizes: 1st, $12; 2nd, $8; 3rd, $4; 4th, highly commended; 5th, commended.
4. Wether, under 1 year. Prizes: 1st, $8; 2nd, $6; 3rd, $4; 4th, highly commended; 5th, commended.
5. Ewe, under 1 year. Prizes: 1st, $8; 2nd, $6; 3rd, $4; 4th, highly commended; 5th commended.
6. Sheep, under 2 years. Prizes: 1st, $10; 2nd, highly commended; 3rd, commended.

SWINE.

Class 16.—Improved Berkshires.

Sect.

1. Barrow, 9 months and under 15. Prizes : 1st, $12 ; 2nd, $8 ; 3rd, $4 ; 4th, highly commended ; 5th, commended.
2. Barrow, 6 months and under 9. Prizes : 1st, $10 ; 2nd, $6 ; 3rd, $4 ; 4th, highly commended ; 5th, commended.
3. Sow, 9 months and under 15. Prizes : 1st, $12 ; 2nd, $8 ; 3rd, $4 ; 4th, highly commended ; 5th, commended.
4. Sow, 6 months and under 9. Prizes : 1st, $10 ; 2nd, $6 ; 3rd, $4 ; 4th, highly commended ; 5th, commended.
5. Sow or barrow, under 6 months. Prizes : 1st, $8 ; 2nd, $6 ; 3rd, $4 ; 4th, highly commended ; 5th, commended.
6. 3 pigs, the offspring of 1 sow, bred by exhibitor. Prizes : 1st, $15 ; 2nd, $10 ; 3rd, highly commended ; 4th, commended.
7. 3 bacon pigs. Prizes : 1st, $15 ; 2nd, $10 ; 3rd, $5 ; 4th, highly commended ; 5th, commended.

Class 17.—Improved Yorkshires.

Sections and prizes same as in class 16.

Class 18.—Chester Whites.

Sections and prizes same as in class 16.

Class 19.—Poland Chinas.

Sections and prizes same as in class 16.

Class 20.—Suffolks and Essex.

Sections and prizes same as in class 16.

Class 21.—Tamworths.

Sections and prizes same as in class 16.

Class 22.—Duroc Jerseys.

Sections and prizes same as in class 16.

Class 23.—Grades and Crosses.

Sect.

1. Barrow, 9 months and under 15. Prizes ; 1st, $12 ; 2nd, $8 ; 3rd, $4 ; 4th, highly commended ; 5th, commended.
2. Barrow, under 9 months. Prizes : 1st, $12 ; 2nd, $8 ; 3rd, $4 ; 4th, highly commended ; 5th, commended.
3. Sow, nine months and under 15. Prizes : 1st, $12 ; 2nd, $8 ; 3rd, $4 ; 4th, highly commended ; 5th, commended.
4. Sow, under 9 months. Prizes : 1st, $12 ; 2nd, $8 ; 3rd, $4 ; highly commended ; 5th, commended.

Class 24.—Sweepstake.

For best animal exhibited in the swine department, a No. 1 Leader corn and root cultivator, value $10, donated by Thom's Implement Works, Watford.

Class 25.—Bacon Pigs.

$25 has been donated towards the prize list for bacon pigs by the Wm. Davies Company, Ltd., Toronto.

Sect.

1. Special by the Ingersoll Packing Company, Ingersoll, Ont., for six best lean singers. Prizes : 1st, $15 ; 2nd, $10.
2. Special by F. W. Fearman, Hamilton, for 5 hogs that will meet the requirements of the packing industry as ideal singers, suitable for export trade. Prizes : 1st, $15 ;2nd, $10.

DAIRY.

$50 each has been donated towards the prize list in the Dairy Department by the Cheese and Butter Associations of Eastern and Western Ontario.

Class 26.—Shorthorns.

Sect.
1. Cow, 36 months and over. Prizes: 1st, $25; 2nd, $15; 3rd, $10; 4th, highly commended; 5th, commended.
2. Cow, under 36 months. Prizes: 1st, $25; 2nd, $15; 3rd, $10; 4th, highly commended; 5th, commended.
3. $100 is donated by the Dominion Shorthorn Breeders' Association to duplicate above prizes.

Class 27.—Ayrshires.

Sect.
1. Cow, 36 months and over. Prizes: 1st, $25; 2nd, $15; 3rd, $10; 4th, highly commended; 5th, commended.
2. Cow, under 36 months. Prizes: 1st, $25; 2nd, $15; 3rd, $10; 4th, highly commended; 5th, commended.
3. $25 additional will be donated by the Ayrshire Breeders' Association for the Ayrshire cow making the best record.

Class 28.—Holsteins.

Sect.
1. Cow, 36 months and over. Prizes: 1st, $25; 2nd, $15; 3rd, $10; 4th, highly commended; 5th, commended.
2. Cow, under 36 months. Prizes: 1st, $25; 2nd, $15; 3rd, $10; 4th, highly commended; 5th, commended.

Class 29.—Jerseys.

Sections and prizes same as in class 28.

Class 30.—Guernseys.

Sections and prizes same as in class 28.

Class 31.—Grades.

Sections and prizes same as in class 28.

Class 32.—Sweepstakes and Specials.

Sect.
1. Sweepstake for cow under 36 months, $30.
2. Sweepstake for cow 36 months or over, $18. } Prince of Wales' prize.
3. The following prizes are offered as specials in this class by the Canadian Holstein-Friesian Association: for the best pure-bred dairy cow, $25; for the two next best Holstein-Friesian dairy cows, registered in the C. H. F. H. B., $15 and $10, respectively.
4. The Holstein-Friesian Association of America offers as specials in this class, $25 for the first, and $15 for the second, to be paid to any Holstein-Friesian cows winning premiums in competition with cattle of other breeds, providing such animals are recorded in the herd book of the Association.
5. In case a pure-bred Ayrshire makes the best record, $25 additional will be donated by the Ayrshire Breeders' Association.

JUDGES.

Cattle.

Thos. Crawford, Toronto, and Robert Miller, Brougham. Reserve, Jas. Smith, Brantford.

Sheep.

Cotswolds: Jos. Snell, Snelgrove; Jos. Gaunt, St. Helen's. Reserve, E. Parkinson, Eramosa
Lincolns: E. Parkinson, Eramosa; Jos. Gaunt, St. Helen's, Reserve, Jos. Snell, Snelgrove.
Leicesters: Jos. Gaunt, St. Helen's; Jos. Snell, Snelgrove. Reserve, E. Parkinson, Eramosa.

Shropshires: Mortimer Levering, Lafayette, Ind., or W. H. Beattie, Wilton Grove; Henry Arkell, Teeswater. Reserve, Wm. Martin, Binbrook.

Southdowns: Wm. Martin, Binbrook; Henry Arkell, Teeswater. Reserve, Mortimer Levering, Lafayette, Ind., or W. H. Beattie, Wilton Grove.

Oxfords: Henry Arkell, Teeswater; Mortimer Levering, Lafayette, Ind., or W. H. Beattie, Wilton Grove. Reserve, Wm. Martin, Binbrook.

Horned Dorsets and Hampshires: Mortimer Levering, Lafayette, Ind., or W. H. Beattie, Wilton Grove; Henry Arkell, Teeswater. Reserve, Wm. Martin, Binbrook.

Grades: Jos. Snell, Snelgrove; Henry Arkell, Teeswater. Reserve, Jos. Gaunt, St. Helen's.

SWINE.

Chester Whites, Poland Chinas, Duroc Jerseys and Grades: Jos. Featherston, M.P., Streetsville; Jos. Brethour, Burford. Reserve, J. C. Snell, Snelgrove.

Berkshires, Yorkshires, Suffolks and Essex, and Tamworths: Thos. Teasdale, Concord; W. H. Jones, Mt. Elgin. Reserve, Andrew Elliott, Galt.

Sweepstake prizes to be awarded by the acting judges in both classes.

Bacon Pigs: C. C. L. Wilson, Ingersoll; Chester Fearman, Hamilton; and J. W. Flavelle, Toronto.

DAIRY.

G. E. Day, O. A. C., Guelph; R. G. Murphy, Elgin; and J. C. Snell, Snelgrove.

ELEVENTH ANNUAL REPORT

OF THE

SHORT-HORN BREEDERS' ASSOCIATION

1896-7.

DOMINION SHORT-HORN BREEDERS' ASSOCIATION.

OFFICERS FOR 1897.

President: ARTHUR JOHNSTON, Greenwood, Ont.

First Vice-President: JAMES RUSSELL, Richmond Hill.

Second Vice-President: JOHN I. HOBSON, Guelph.

Vice-Presidents from Provinces:

ROBERT MILLER, Brougham, Ont.
F. G. BOVYER, Georgetown, P. E. I.
J. H. LADNER, Ladner's Landing, B. C.
JAMES A. COCHRANE, Hillhurst, Que.
SENATOR JOSIAH WOOD, M. P., Sackville, N. B.
J. S. ROSS, Moose Jaw, Alta.
O. CHASE, Church Street, N. S.
JOHN E. SMITH, Brandon, Man.

Board of Directors:

A. List.	B. List.	C. List.
EDWARD JEFFS, Bondhead.	W. J. BIGGINS, Clinton.	H. CARGILL, M.P., Cargill.
H. SMITH, Hay.	DAVID RAE, Fergus.	ALEX. SMITH, Maple Lodge.
T. E. ROBSON, Ilderton.	JAMES TOLTON, Walkerton.	JOHN ISAAC, Markham.
F. I. PATTON, M.D., St. George.	WILLIAM LINTON, Aurora.	W. G. PETTIT, Freeman.
WILLIAM DAWSON, Victoria.	JOHN DAVIDSOM, Ashburn.	C. M. SIMMONS, Ivan.

Executive and Finance Committee: JAMES RUSSELL, Richmond Hill, Ont.; ROBERT MILLER, Brougham, Ont.; JOHN I. HOBSON, Guelph, Ont.; ARTHUR JOHNSTON, Greenwood, Ont.; WILLIAM LINTON, Aurora, Ont.

Delegates to Industrial Exhibition: HON. JOHN DRYDEN, Brooklin, Ont.; JOHN I. HOBSON, Guelph, Ont.

Delegates to Western Fair: HENRY SMITH, Hay; C. M. SIMMONS, Ivan.

Secretary and Editor: To whom all communications are to be sent, HENRY WADE, Toronto.

SHORT-HORN BREEDERS' ASSOCIATION FOR 1896-7.

LIST OF MEMBERS.

Name.	Address.
Adams, W. H	Saltcoats, Assa.
Alexander, D.	Brigden, Ont.
Allin, Samuel, & Sons	Bowmanville, Ont.
Allin, Thomas, & Bros	Oshawa, Ont.
Alton, Thomas, & Sons.	Appleby, Ont.
Anderson, Thomas	Dungannon, Ont.
Andrews, Thomas	Cambridge, Neb., U.S.A.
Archibald, C. A	Truro, N.S.
Arnold, H. G., & Son	Maidstone Cross, Ont.
Baker, Frederick	Dashwood, Ont.
Baker, F. C	Binscarth, Ont.
Ballantyne, T., & Sons	Stratford, Ont.
Barclay, S., & Sons	Port Hope, Ont.
Barron, John G	Carberry, Man.
Bathgate, Peter	Eramosa, Ont.
Batty, Robert	Meaford, Ont.
Bell, James	Markdale, Ont.
Bell, Joseph	Zephyr, Ont.
Benson, H. D	Ladner's Landing, B.C.
Betzner, J. S.	Breslau, Ont.
Bice, Artemus	Clandeboye, Ont.
Biggins, W. J.	Clinton, Ont.
Birdsall, F., & Son	Birdsall, Ont.
Blyth, Robert	Marden, Ont.
Bolton, James	Dewdney, Alta.
Bonnycastle, Frank	Campbellford, Ont.
Botterell, E. H.	Cochrane, Alta.
Boulter, Wm., & Sons	Picton, Ont.
Bovyer, F. G.	Georgetown, P.E.I.
Brady, Thomas	Chatham, Ont.
Brandon, William	Napanee, Ont.
Bratt, Jesse, & Son	Regina, Assa.
Bricker, John	Elmira, Ont.
Brien, Edward	Ridgetown, Ont.
Brigham, Henry	Allan Park, Ont.
Bright, W., & Sons	Raglan, Ont.
Bristow, George B.	Rob Roy, Ont.
Broadfoot, James	Seaforth, Ont.
Brodie, A. C., & Son	Bethesda, Ont.
Brown, A. & D	Iona, Ont.
Brown, James	Norval, Ont.
Brown, R.	Orono, Ont.
Brownlee, R. H.	Aughrim, Ont.
Brubacher, M. E.	St. Jacob's, Ont.
Burch, D. B.	Lambeth, Ont.
Burnett, George	Winterbourne, Ont.
Burnett, Leonard	Greenbank, Ont.
Burns, Alexander	Rockwood, Ont.
Burns, David	Brooklin, Ont.
Burt, Robert	St. George, Ont.
Calder, Charles	Brooklin, Ont.
Calder, John L.	Seagrave, Ont.
Calder, W. M.	Glanford, Ont.
Campbell, J., & Bros	Crosshill, Ont.
Campbell, Peter	Amberley, Ont.
Canadian Land & Ranch Co.	Crane Lake, Alta.
Cargill, H., & Son	Cargill, Ont.
Carruthers, C. & J	Cobourg, Ont.
Carruthers, H., & Son	Cobourg, Ont.
Cartmell, James	Westbourne, Ont.
Caswell, James	Renfrew, Ont.
Central Exhibition Co.	Ottawa, Ont.
Central Experimental Farm	Ottawa, Ont.
Chambers, William	Currie's Crossing, Ont.
Charteris, Robert	Egmondville, Ont.
Chase, E. & O.	Church Street, N.S.
Chinnick, J. & E.	Chatham, Ont.
Clark, David	Bottineau, N. Dak., U.S.
Claus, W. W.	Vineland, Ont.
Clayton, George	Peepabun, Ont.
Cleveland, C. C	Danville, Que.
Coad, R., & Sons	Strathburn, Ont.
Coakwell, William	Green River, Ont.
Cochrane, Hon. M. H., & James A	Hillhurst, Que.
Coe, Wm., Estate of	Madoc, Ont.
Coghlan, George	Eramosa, Ont.
Connolly, John	Lindsay, Ont.
Cook, A. L.	Corinth, Ont.
Cook, John, jun	Amulree, Ont.
Cousins, John, & Sons	Harriston, Ont.
Cowan, James	Guelph, Ont.
Crerar, James, & Sons	Shakespeare, Ont
Cullis, John, & Sons	Fenelon Falls, Ont.
Cumberland, Joseph	Listowel, Ont.
Cutler, Elis	Coldstream, Ont.
Dale, Valentine, & Sons.	Oakwood, Ont.
Darke, Richard	Lindsay, Ont.
Daunais, C. M.	Battleford, Sask.
Davidson, Charles	Acton, Ont.
Davidson, James I., & Son	Balsam, Ont.
Davidson, John	Ashburn, Ont.
Davies, Robert	Toronto, Ont.
Davis, C. G.	Freeman, Ont.
Davis, Edward	Emerson, Man.
Davis, H. J.	Woodstock, Ont.
Davis, J. F	Glanworth, Ont.
Dawson, William	Vittoria, Ont.
Denmark, William	Shellmouth, Man.
Dickie, George	Hyde Park, Ont.
Dickison, William	Mildmay, Ont.
Dickson, John M.	Innisfail, Assa.
Dixon Bros.	Maple Creek, Assa.
Dobson, Robert	Epsom, Ont.
Dods, John M.	Alton, Ont.
Doidge, George	Plainville, Ont.
Donaldson, William	South Zorra, Ont.
Douglas, James	Caledonia, Ont.
Douglas, John	Streetsville, Ont.
Douglas, Thos. & Sons.	Strathroy, Ont.
Dow, Peter	Fergus, Ont.
Doyle, John	Elora, Ont.

LIST OF MEMBERS—*Continued.*

Name.	Address.	Name.	Address.
Doyle, R. J.	Owen Sound, Ont.	Hillhouse, R.	Broadview, Assa.
Dredge, Wm., & Sons	Nassagaweya, Ont.	Hind, H.	Hagersville, Ont.
Dryden, Hon. John	Brooklin, Ont.	Hobson, John I	Guelph, Ont.
Drysdale, James W	Neepawa, Ont.	Hogg, William	Thamesford, Ont.
Duff, Robert	Myrtle, Ont.	Holdsworth, R.L., & Son	Port Hope, Ont.
Dunlop, Samuel	Eady, Ont.	Hole Bros	Minnedosa, Man.
Dyer, D. D	Columbus, Ont.	Hollingshead, J	Tottenham, Ont.
		Holmes & Moore	Inwood, Ont.
Edwards, W. C., & Co.	Rockland, Ont.	Hosken, John	Bowmanville, Ont.
Elliott, H. J	Danville, Que.	Hostetler, C	New Hamburg, Ont.
Elliott, W. R	Everton, Ont.	Houston, John	Chatham, Ont.
Elrick, William	Hillsdale, Ont.	Hunter, James	Alma, Ont.
		Hyde, G. A. E.	Hyde, Assa.
Fairbairn, H. K	Thedford, Ont.		
Falkner, John, Estate of.	Alma, Ont	Ireland, C. E. & G.	Nelson, Ont.
Farr, C. A.	Petrolea, Ont.	Isaac, John	Markham, Ont.
Ferguson, James	Thamesville, Ont.	Isaac, W. J	Harwood, Ont.
Ficht, Valentine	Oriel, Ont.		
Fleming, Alexander, jr.	Kilsyth, Ont.	James, Walter	Rosser, Man.
Fletcher, John	Binkham, Ont.	Jamieson, Andrew	Shrigley, Ont.
Foley, R. D	Manitou, Man.	Jeffrey Bros	Whitby, Ont.
Found, James	Dunbarton, Ont.	Jeffs, Edward, & Son	Bond Head, Ont.
Fraser, D., & Sons	Emerson, Man.	Jestin, John	Everton, Ont.
Fraser, R. P.	Minnedosa, Man.	Johnston, Arthur	Greenwood, Ont.
Freestone, C., & Son	Meaford, Ont.	Johnston, George H	Ashburn, Ont.
Fried, John	Roseville, Ont.	Johnston, Henry	Tara, Ont.
Fulton, William	Brewster, Ont.	Johnston, H. M	Calder, Ont.
		Johnston, Jas. H. & Son.	Hillsdale, Ont.
Gainer, W. H	Welland, Ont.	Johnston, Samuel	Fordwich, Ont.
Gardhouse, James S	Highfield, Ont.		
Gardhouse John	Highfield, Ont.	Kay, Charles	Fergus, Ont.
Gardner, J. & F.	Britannia, Ont.	Kearns, John	Palmerston, Ont.
Garnham, Robert	Guysboro', Ont.	Kemp, John	Hazeldean, Ont
Gaunt, E., & Sons	St. Helen's, Ont.	Kiteley, Joseph	Dunkerron, Ont.
Gibson, J. T	Denfield, Ont.	Knight, Henry	Mullifarry, Ont.
Gibson, Richard	Delaware, Ont.		
Gibson, William	Wolseley, Assa.	Ladner, W. H.	Ladners' Landing, B.C.
Gier, G. & W.	Grand Valley, Ont.	Laidlaw, James	Guelph, Ont.
Gilmour, Lieut.-Colonel.	Stanbridge East, Que.	Laidlaw, James	Clearwater, Man.
Glen, Robert	Owen Sound, Ont.	Lang, R. L	Oak Lake, Man.
Golding, Henry	Thamesford, Ont.	Lawr, J. C.	Avon, Ont.
Gorwill, S. B.	Fanshawe, Ont.	Lawrence, Joseph	Clearwater, Man.
Gowanlock, John	Port Elgin, Ont.	Laycock, Henry	Morden, Man.
Gowanlock, Robert	Maple Hill, Ont.	Leask, J.	Taunton, Ont.
Graham, Andrew	Pomeroy, Man.	Lee, John, & Son	Highgate, Ont.
Graham Bros.	Ailsa Craig, Ont.	Leslie, George	Acton, Ont.
Grainger, Wm., & Sons.	Londesboro', Ont.	Linton, William	Aurora, Ont.
Griffith, J. & G	Wallace, Ont.	Lister, W. S.	Middle Church, Man.
Groff, Israel	Alma, Ont.	Livingston, Donald	Yorkton, Assa.
Grummett, G. & E.	Morden, Man.	Logie, H. C	Lindsay, Ont.
		Loree, George P.	Roland, Man.
Hall, Arthur J	Minnedosa, Man.	Lynch, Walter	Westbourne, Ont.
Hall, John	Holland, Man.		
Hanley, J. C.	Read, Ont.	MacArthur, James	Gobles, Ont.
Hardy, John A.	Kent Bridge, Ont.	MacColl, Samuel	Cowal, Ont.
Hardy, J. & G	Ashgrove, Ont.	Madigan, James	Caledonia, Ont.
Hargrave, James	Medicine Hat, Assa.	Magee, William	Janetville, Ont.
Harrison, John	Niverville, Man.	Main, John	Pentland, Ont.
Hartman, J. W	Elmhedge, Ont.	Mansfield, J.	Brandon, Man.
Hastings, Robert	Wingham, Ont.	Marquis, George	Victoria Corners, Ont.
Hay, C. Drummond	Belmont, Man.	Martin, H. M	Conestogo, Ont.
Hay, William	Tara, Ont.	Martindale, F.	York, Ont.
Heddle, James	Wilkesport, Ont.	Martyn, J. W	Canton, Ont.
Helliwell, W. J	Oak Lake, Man	Matchett, Alex.	Treherne, Man.
Hendrie, William	Hamilton, Ont.	Menzie Bros.	Shoal Lake, Man.
Hermiston, Robert	Mount Forest, Ont.	Menzie, W. & J	Kirkwall, Ont.
Hill, David	Staffa, Ont.	Meyer, John	Kossuth, Ont.
Hill, George	Delaware, Ont.	Miller, John	Markham, Ont.

LIST OF MEMBERS—*Continued.*

Name.	Address.	Name.	Address.
Miller, John, & Sons....	Brougham, Ont.	Patten, F. I., M.D.. . .	St. George, Ont.
Milliken, William	Hagerman's Corners, Ont	Patterson, James... . .	Lombardy, Ont.
Millman, William	Dexter, Ont.	Patteson T. C.	Eastwood, Ont.
Milloy, Capt. D .. ..:	Paris, Ont.	Payne, J. C	Cayuga, Ont.
Milne, David	Ethel, Ont.	Pearson, S. G., & Son ..	Meadowvale, Ont.
Minor, G. D	Sparta, Ont.	Pemberton, F. B.....	Victoria, B.C.
Minthorn, Albert E....	Powle's Corners, Ont.	Perdue, Henry	Campbell's Cross, Ont.
Mitchell, John.....	Waterdown, Ont.	Pettit, W. G	Freeman, Ont.
Mitchell. R.....	Nelson, Ont	Philp, R. W	Cadmus, Ont.
Moffat, W. G	Teeswater, Ont.	Playfair, A W.	Baldur, Man.
Monk, Ephraim	Springford, Ont.	Porter, William	Lloydtown, Ont.
Monroe. John A.....	Springbank, Alta.	Potter, James	Blyth, Ont.
Morgan, John & Sons...	Kerwood, Ont.	Powers, Simon, & Son ..	Orono, Ont.
Morton, E. D., M.D....	Barrie, Ont.	Pritchard, R.....	Prince Albert, Sask.
Mouncey, John.....	Fraserville, Ont.	Prout, George M	Zephyr, Ont.
Mulholland, J. T.....	Baltimore, Ont.	Pugh, Thomas & Sons ..	Whitevale, Ont.
Murray, Charles.....	Stanford, Ont.		
McAllister, D	Comber, Ont.	Querengessor, Charles ..	Brodhagen, Ont.
McAvoy, F C	Balsam, Ont.		
McBeth, Donald..... ..	Oak Lake, Man.	Rae, David.....	Fergus, Ont.
McCaig, Alexander....	Aberfoyle, Ont.	Raikes, George	Barrie, Ont.
McConnell, John.....	Seaforth, Ont.	Rankin, Charles	Wyebridge, Ont.
McCorkindale, John....	Guelph, Ont.	Rankin, George	Hamiota, Man.
McCullogh, R. C.	Georgetown, Ont.	Rankin, Samuel	Fairview, Ont.
McCully, John	Cedar Springs, Ont.	Rawlings, Heber, & Son.	Ravenswood, Ont.
McCurdy, S. D	Vienna, Ont.	Redmond, William.....	Mill Brook, Ont.
McDermott, J. & C E..	Angus, Ont.	Reid, E. Osborne.....	Cochrane, Alta.
McDermott, W. & C....	Living Spring, Ont.	Reid, George A.....	Cochrane, Alta.
McDiarmid, Peter.....	Belmont, Man.	Reiner, F. S.....	Neustadt, Ont.
McDonald, D K.....	Speedside, Ont.	Renton, John	Delcraine, Man.
McEwan, J. & W.....	Delaware, Ont.	Ridd, J. B	Rothsay, Ont.
McGarry, William	McGarry, Ont.	Riddell, James	Beeton, Ont.
McGill, Bros	Carrolton, Man.	Rivers, William	Walkerton, Ont.
McGregor, Bros	Tilbury, Ont.	Robertson, John...	Wyoming, Ont.
McGuigan, C.....	Cedar Springs, Ont.	Robinson, Charles	Odelltown, Ont.
McGurk, H	Colinville, Ont.	Robinson, Joseph.....	Romney, Ont.
McIntyre, Archibald....	Campbellville, Man.	Robson, J. S	Manitou, Man.
McKay Bros	Kippen, Ont.	Robson, R. S. & J. G...	Ilderton, Ont.
McKenzie, Adam.....	Brookdale, Man.	Robson, T. E.....	Ilderton, Ont.
McKenzie, James	Burnside, Man.	Ross, J. A.....	Lake Dauphin, Man.
McKenzie, Kenneth	Burnside, Man.	Ross, James.....	Barrie, Ont.
McKenzie, Kenneth, jr.	Burnside, Man.	Routledge, J. I.....	Miami, Man.
McKenzie & Cooper	Battleford, Sask.	Routledge, J. T	Georgetown, Que.
McKinnon, Alexander..	Coningsby, Ont.	Rowand, James.....	Dumblane, Ont.
McLaren, D	Dunmore, Ont.	Russell, J. & W.....	Richmond Hill, Ont.
McLennan, R	Moropano, Man.	Russell, Thomas.....	Exeter, Ont.
McMillan, D	Dutton, Ont.	Ruston, F., & Sons.....	Sebringville, Ont.
McMurray, Robert	Sunnidale, Ont.	Rutherford, Joseph	Boise, N.Y., U.S.A.
McNab, John	Rockwood, Ont.	Rutherford, William....	South Monaghan, Ont.
McPhail, D. P.....	Vernon, Ont.		
McQueen, J. & R..... .	Salem, Ont.	Salke'd, John L..... ..	Dongola, Assa.
McTaggart, Alexander..	Sonya, Ont	Sangster, R. R	Lancaster, Ont.
McTavish, Peter & Son.	Gad's Hill, Ont.	Scott, F. W.....	Highgate, Ont.
		Scott, John.	Ivan. Ont.
Naisbitt, T. B.....	Rapid City, Man.	Scott, Thomas.....	Sutton West. Ont.
Newmarket. Henry.....	Strathewen. Ont.	Searles, E. & Sons	Rockwood, Ont.
Nicholson, R. & S	Sylvan, Ont.	Secord, James R. R	Homer, Ont.
Noble, Francis.....	Wawanessa, Man.	Shanks, James W	Rapid City, Man.
Nott, Thomas	McLennan, Algoma, Ont.	Shantz, Solomon...	Haysville, Ont.
		Sharman & Sharman ...	Souris, Man.
Oliver, George.....	Galt, Ont.	Sharpe, Thomas A.....	Experimental Farm, Agassiz, B.C.
Ont. Agricultural College	Guelph, Ont.		
		Shaver, Frederick	Little Britain. Ont.
Park, James	Vickers, Ont.	Shaw, A. J. C.....	Thamesville, Ont.
Parker, Henry	Durham, Ont.	Shaw, Henry..	Colinville, Ont.
Parkinson, E & C.....	Thornbury, Ont.	Shaw, Thomas	Woodburn, Ont.
Paterson, A C.....	Lucknow, Ont.	Sheppard. J. B.....	Newbury, Ont.
Patrick, Wm.....	Ilderton, Ont.	Shibley, Jacob E.....	Harrowsmith, Ont.

LIST OF MEMBERS—*Concluded.*

Name.	Address.	Name.	Address.
Shier, William	Sunderland, Ont.	Titus, A. A	Napinka, Man.
Shore, F., & Bros	White Oak, Ont.	Toles, Peter	Mount Brydges, Ont.
Short, Hugh	Elora, Ont.	Tolton, James	Walkerton, Ont.
Sibbald, F. C., M.D	Sutton West, Ont.	Tom, William	Shirley, Ont.
Simmons, C. M	Ivan, Ont.	Tucker, George	Bosworth, Ont.
Simpson, C. M	Almonte, Ont.	Tucker, W. R	Saskatoon, Sask.
Sinclair, D	Anderson, Ont.	Turner, J. H	Bottineau, Dak., U.S.A.
Smith, Amos	Trowbridge, Ont.	Tyrwhitt, Lieut -Col. R.	Bradford, Ont.
Smith, David	Maple Leaf, Ont.		
Smith, W. H	Meaford, Ont.	Van Nostrand, John	Aurora, Ont.
Smith, James S	Maple Lodge, Ont.	Vetznar, J. S	Breslau, Ont.
Smith, James	Owen Sound, Ont.		
Smith, John, & Sons	Duntroon, Ont.	Waddel, Alexander	Claremont, Ont.
Smith, John E	Brandon, Man.	Ward, Joseph	Marsh Hill, Ont.
Smith, Thomas R	Romney.	Warnica, J. L	Painswick, Ont.
Smith, H. & W	Hay, Ont.	Warren, John	Acton, Ont.
Smyth, Henry	Chatham, Ont.	Washington, J. G	Ninga, Man.
Snarey, Bilton	Croton, Ont.	Watson, A. J	Castlederg, Ont.
Snarey, Henry	Croton, Ont.	Watson, William	Dalesboro', Assa.
Snell, James	Clinton, Ont.	Watt, J. & W. B	Salem, Ont
Somerville, William	Montefiore, Man.	Webster, H. B	Fergus, Ont.
Srigley, John	Allandale, Ont.	Werry, William	Solina, Ont.
Staples, George	Lifford, Ont.	White, A. T	Pembroke, Ont.
Steele, James	Amberley, Ont.	White, Robert	Wakopa, Man.
Steele, James T	Spallumcheen, B.C.	White, William	Mitchell, Ont.
Stewart, Angus	Westbourne, Man.	Whitelaw, A. & W	Guelph, Ont.
Stewart, Neil	Gillies Hill, Ont.	Whitson, Robert	Atha, Ont.
Stewart, Peter	Atha, Ont.	Wilkinson, Maj.-General H. C	Birtle, Man.
Stocks, James	Columbus, Ont.	Wilson, C. J	Schomberg, Ont.
Stockwell, C. F	Danville, Que.	Wilson, D. D	Seaforth, Ont.
Stone, F. W., Estate of.	Guelph, Ont.	Wilson, James	Dugald, Man.
Stott, Wm. H	Brandon, Man.	Wilson, J. L	Gorrie, Ont.
Strowbridge, H. L	Cookshire, Que.	Wilson, John, & Sons	Whitevale, Ont.
Stutt, John A	Fairmede, Assa.	Wilson, William	Brampton, Ont.
		Wilson, William	Ripley, Ont.
Taylor, Joseph	Fairfax, Man.	Winteringham, V	Brandon, Man.
Taylor, W. H	Park Hill, Ont.	Wood, Josiah	Sackville, N. B.
Thompson, A. R	Stamford, Ont.	Wood & Anderson	Maple Creek, Assa.
Thomson, Hugh	St. Mary's, Ont.	Wright, Herbert	Guelph, Ont.
Thomson, James	Mildmay, Ont.		
Thomson, Robert	St. Mary's, Ont.		

DOMINION SHORT-HORN BREEDERS' ASSOCIATION.

DIRECTORS' MEETING.

This meeting was held in the Albion Hotel, Toronto, on Tuesday the 2nd of February, 1897, at 8. p.m.

The following members were present: Arthur Johnston, President, Greenwood; John I. Hobson, Guelph; Jas. Russell, Richmond Hill; Robt. Miller, Brougham; Edward Jeffs, Bond Head; H. Smith, Hay; F. I. Patten, M.D. St. George; Wm. Dawson, Vittoria; W. J. Biggins, Clinton; David Rae, Fergus; Jas. Tolton, Walkerton; Wm. Linton, Aurora; John Davidson, Ashburn; W. C. Pettit, Freeman; C. M. Simmons, Ivan; John Isaac, Markham; Alex. Smith, Maple Lodge; and H. Wade, Secretary.

The Annual Report was taken up clause by clause, and the Directors were well satisfied with the work that had been done in the past year, and were also well pleased with the splendid financial standing of the Association.

Mr. JOHNSTON said there was a matter that should come before this Board with regard to percentage allowed to Mr. Wade. At the time the arrangement was made last fall with Mr. Wade, it was merely guess work as to what would be the probable remuneration for the work done in the office. I suppose you are all aware we pay nobody but Mr. Wade; he finds his own help and we merely pay him a percentage. It was thought at the time that a percentage of thirty-two and a half cents on each pedigree and ten cents for transfers and ten cents for duplicates would probably amount to about his salary. This Mr. Wade found did not come up to the expectation. It was arranged at the time if we thought it was not a reasonable sum it was to be within the power of this Board to change it. We undertook to endorse and sanction a motion to the effect to make it thirty-five cents instead of thirty-two and a half, but it will be with this Board to review that matter. I think this Board should sanction the resolution of the Executive Committee or negative it.

It was moved by W. J. BIGGINS, and seconded by John I. HOBSON: "That the Secretary's commission for registrations in the future be thirty-five cents instead of thirty-two and a half as heretofore; but the other charges on duplicates and transfers to be the same." Carried.

Mr. WADE then explained to the Directors that he had only received for all his commissions this last year some $1,004, which, after paying all hands left him $100 short of the salary he got heretofore from the Shorthorn Breeders' Association. In 1895 the Association paid out for office work, clerks, etc., $365 more than this year, and the year before that over $1,000 more, and in view of that, he only asked the Board to give him thirty-five cents per registration on the work to be done, but also asked them to make it retroactive this last year.

Mr. LINTON: I think Mr. Wade has been a very efficient Secretary, and has always been very willing to give us any information and do the work at the very least possible sum it could be done at, and it is only right and just that we should remunerate him for his services.

Mr. Hobson also thought Mr. Wade should be allowed the two and a half cents extra on all registrations during 1896, as he was a very courteous and obliging Secretary, and had always done his best to further the interests of the Association.

It was moved by Wm. Linton, seconded by John I. Hobson, that Mr. Wade be allowed the extra two and a half cents on each registration for 1896, amounting to $75. Carried.

A discussion then took place as to the amounts to be granted in prizes at the different shows, and a series of resolutions were drawn up in readiness to be confirmed at the annual meeting next day.

ANNUAL MEETING.

The eleventh annual meeting of the Dominion Shorthorn Breeders' Association was held in the Auditorium Toronto, at 11 a.m., February 3rd, 1897.

The following members were present: Arthur Johnston, President, Greenwood; Jas. Russell, Richmond Hill; John I. Hobson, Mosboro; Robt. Miller, Brougham; D. D. Wilson, Seaforth; John Isaac, Markham; W. G. Pettit, Freeman; C. M. Simmons, Ivan; Edward Jeffs, Bond Head; H. Smith, Hay; F. I. Patten, M.D., St. George; William Dawson, Vittoria; W. J. Biggins, Clinton; David Rae, Fergus; T. E. Robson, Ilderton; Jas. Tolton, Walkerton; Wm. Linton, Aurora; John Davidson, Ashburn; J. C. Hanley, Read; C. W. Clemons, St. George; Jas. Gardhouse, Highfield; Robt. Duff, Ashburn; John Bright, Raglan; C. Calder, Brooklin; J. C. Patteson, Toronto; Wm. Weld, London; A. Watson, Castlederg; Dr. A. Smith, Toronto; J. E. Brethour, Burford; A. Smith, Maple Lodge; and H. Wade, Secretary, Toronto.

PRESIDENT'S ADDRESS.

By Arthur Johnston Greenwood.

In addressing you at the beginning of another Shorthorn year, I think I cannot do better than refer for a short time to the past history, the present state, and the future prospects in this country and in the United States from a business point of view, and in doing so I wish to call your attention to some of the causes which in my opinion have led up to nearly all, if not all the depressions we have experienced during the past thirty years or more.

First then, as to the past history, I may say it has consisted of a series of three distinct and widely different states, viz., the healthy, even and progressive business periods, when any man of known honesty, intelligence, and perseverance could make a success of the business as well as a little money out of what I think a pleasant calling, and at these periods I think I may say that few excepting such men have been engaged in the trade.

During the period of straight business and honest effort on the part of the breeders and importers of thirty odd years ago, success depended as it ought to do on producing good animals with sound, old pedigree. Those good ones sold at good prices, though no better than their merits deserved, and those prices attracted the attention of men of wealth, and also, alas, of speculators and adventurers without either money, judgment, or fancy for the animals themselves, but who entered the business solely to make money out of it, and to make it quickly. Those men by their lavish expenditure of money and extravagant advertising soon monopolized the foremost ranks amongst breeders, though they very seldom bred anything but pedigrees, if indeed they took time to breed at all, between public sales.

Certain animals bred or imported by the genuine breeder and fancier brought good prices on their individual merits, and this circumstance induced the speculator to fly off and buy all the sisters, aunts and nieces to be found of this justly celebrated animal or animals, all of which were absolutely certain to figure in an extensively advertised sale within a year or perhaps in a very much shorter period.

For a time this method seemed to succeed. Animals of no real merit from the genuine fancier's point of view, soon supplanted the best of the breed and monopolized all attention—the attention, I mean of what has now become a fraternity of jobbers in pedigrees instead of enthusiastic breeders or producers of good cattle. From this it was an easy descent to the so called line breeding or pedigree craze which culminated in the famous New York Mills' sale, when a cow sold for the enormous sum of forty thousand six hundred dollars, one of the worst days for the Shorthorn trade in its whole history.

After this sale for a time good cattle became a comparative drug in the market, unless they were bred in a particular line, and if they had the good fortune to be so bred, individual merits might almost be said to be unnecessary in order to fetch a big figure.

After lasting long enough to almost kill the legitimate breeding for merit, this period was followed by a more rational one, when during the eighties, while cattle were required to have good pedigrees before they could be counted on to bring good prices, pedigrees without individual merit in the cattle were as they ought to be of little value. When this period succeeded nearly the whole of the speculators, and I am sorry to say most of the monied men dropped out of the business, and in this way vast sums of money were withdrawn from the trade, which could have no other effect than to greatly depress the business. This depression we have all been feeling in recent years, and I am sorry to have to say we are still feeling it in the low prices that we obtain for our stock. While we are still feeling the depression, I am bound to say that at the present time, I believe, we are not suffering from the hard times any more, if as much, as most other lines of business.

Another and a very potent cause of the recent depression in Shorthorn matters has arisen from the rush of so many of our farmers into the so called milking breeds, caused to a very great extent no doubt, by the undoubted increase in the consumption of and demand for dairy products all over the British world. The force of this (in many cases) foolish rush has, I believe, been spent, and a reaction is unquestionably taking place.

With regard to the present state of the Shorthorn trade, I think I may say that while it cannot be called good, there is nothing a farmer can produce that meets with a readier market or pays better than really good, young Shorthorn bulls of reliable breeding, and by good, reliable breeding, I mean animals bred from really good ancestors, on all sides, and especially the more recent ancestors.

As to the future prospects of the business, or as I would like to call it, profession, I may say that it is dangerous to predict, even now when everything looks favorable. In the first place really good cattle of any breed are well known to be scarce, and in demand, though prices are still low in their case as in all others.

The dairy boom has, I firmly believe, spent its force to a very great extent, so that while suitable districts and certain well qualified men may still continue in the milk business, it will not, I am certain, be followed so indiscriminately by unskilled men, and in unsuitable districts as has been the case in recent years. Not only this, but the demand for good feeding cattle and the consequent rise in their price that must take place are certain to draw farmers to the good, old standard and general purpose breed, the only breed that can be relied on to produce good milkers, and at the same time furnish the very primest of steers and heifers for the butcher.

We have now, as I said above, got rid of the speculators to a very great extent, and we have, I believe, seen the end of the injurious effects of the withdrawal of so much money from the business. This lands us on a sounder basis than we have in recent years occupied. During the big price period, credit was almost invariably the practice, as

speculators counted on selling their cattle before paying for them. There is vastly less credit now than at any former period during the past thirty-five years, and this is another promising feature in the trade and not the least promising.

On the whole I cannot choose but look with greater confidence to the future of the Shorthorn business than I have been able to do for many years. There never has been a keener or more general demand for young bulls than we have experienced during the past two months, notwithstanding great stagnation in almost all other lines of business as well as the low prices obtained for beef, pork, and indeed almost all kinds of farm products. It is true that we have sold at possibly the lowest prices obtained in many years, but even the prices obtained are quite as good as the prices realized for other farm commodities, and I believe better, all things considered.

If I were asked my opinion as to the greatest want in Shorthorn matters in this country and in the United States, I would unhesitatingly answer, the lack of monied men who take an active part and participating interest in this and in all other matters pertaining to agriculture.

In the old lands it is vastly different. There from Royalty down to the tenant farmer all take a pride and a patriotic desire to be connected with the soil on which they live other than mere ownership and revenue derived therefrom. I think the subject is worthy of the consideration of our men of wealth. It is not to be hoped that the wealthy can make money in any line of farming, but the country can never prosper while only the very poor farm ; and if men of wealth and social standing hold aloof from the soil, the more moderately wealthy will also avoid it, whereas if our wealthiest citizens made it fashionable to take up some lines of agriculture, monied men of less means would imitate and the certain result would be improved methods and more ambition.

In England and Scotland, and indeed all the old lands, the tenant farmer has many opportunities during the year of meeting on equal terms with his lordship of high degree who is engaged in farming in the vicinity. Even the Queen and Prince of Wales are largely engaged in farming and pure-bred stock raising.

In conclusion I desire to say that no class of business men in the world have stood higher from a moral standpoint than the real breeders and importers of Shorthorn cattle during the past fifty years. This has been so not only in Canada but also in the United States and Great Britain. It is much to say, but I believe it will not be contradicted. If we do not number in our ranks men of great wealth, we do number among us men of great ability and considerable influence, and I venture to say that in every neighborhood in which they are found, they will at least carry a full share of the respect and trust of the locality. It is so in all countries of which I have any knowledge.

REPORT OF THE SECRETARY AND EXECUTIVE COMMITTEE.

Toronto, February 2nd, 1897.

The Executive Committee beg to present the Eleventh Annual Report of the affairs of this Association as furnished by the Secretary for the year ending 31st December, 1896.

Registrations.

In 1896 we were paid for 2,957 registrations, 3,017 certificates, and 379 changes of ownership ; against, in 1895, 3,000 registrations, 3,100 certificates, and 450 changes of ownership ; and against, in 1894, 3,045 registrations, 3,142 certificates, and 493 transfers ; and against, in 1893, 3,484 registrations, 3,142 certificates, and 587 transfers.

Registration Fees.

Following up the change in registrations, as a matter of course there is a corresponding change in registration fees. In 1891 we received $3,152.50; in 1892, $3,835.25; in 1893, $3,787.45; in 1894, $3,357.75, in 1895, $3,222.00; and in 1896, $2,954.00.

Herd Books.

Vol. I.—There were sent out in 1887, 550 volumes; in 1888, 51 volumes; in 1889, 33 volumes; in 1890, 19 volumes; in 1891, 21 volumes; in 1892, 27 volumes; in 1893, 18 volumes; in 1894, 20 volumes; in 1895, 1 volume, also 161 volumes burnt; and in 1896, 3 volumes; leaving on hand 96 volumes.

Vol. II.—There were sent out in 1888, 151 volumes; in 1889, 39 volumes; in 1890, 26 volumes; in 1891, 16 volumes; in 1892, 20 volumes; in 1893, 14 volumes; in 1894. 16 volumes; in 1895, 2 volumes, also 118 volumes burnt; and in 1896, 6 volumes; leaving on hand 292 volumes.

Vol. III.—There were sent out in 1888, 226 volumes; in 1889, 189 volumes; in 1890, 46 volumes; in 1891, 16 volumes; in 1892, 19 volumes; in 1893, 10 volumes; in 1894, 17 volumes; 1895, 4 volumes, also 74 volumes burnt; and in 1896, 4 volumes; leaving on hand 392 volumes.

Vol. IV.—There were sent out in 1889, 302 volumes; in 1890, 105 volumes; in 1891, 29 volumes; in 1892, 21 volumes; in 1893, 5 volumes; in 1894, 13 volumes; in 1895, 4 volumes, also 122 volumes burnt; and in 1896, 9 volumes; leaving on hand 287 volumes.

Vol. V.—There were sent to members in 1890, 134 volumes; in 1891, 130 volumes; in 1892, 78 volumes; in 1893, 39 volumes; in 1894, 33 volumes; in 1895, 9 volumes, also 206 volumes burnt; and in 1896, 14 volumes; leaving on hand 377 volumes.

Vol. VI.—There were sent out in 1981, 345 volumes; in 1892, 29 volumes; in 1893, 32 volumes; in 1894, 29 volumes; in 1895, 9 volumes, also 165 volumes burnt; and in 1896, 18 volumes; leaving on hand 373 volumes.

Vol. VII.—There were sent out in 1892, 318 volumes; in 1893, 28 volumes; in 1894, 33 volumes; in 1895, 17 volumes, also 241 volumes burnt; and in 1896, 24 volumes; leaving on hand 279 volumes.

Vol. VIII,—There were sent out in 1893, 304 volumes; in 1894, 38 volumes; in in 1895, 25 volumes, also 258 volumes burnt; and in 1896, 40 volumes; leaving on hand 335 volumes.

Vol. IX.—There were sent out in 1894, 269 volumes; in 1895, 46 volumes, also 312 volumes burnt; and in 1896, 45 volumes; leaving on hand 328 volumes.

Vol. X.—There were sent out in 1895, 317 volumes, also 40 volumes burnt; and in 1896, 68 volumes; leaving on hand 575 volumes.

Vol. XI.—There were sent out in 1896, 249 volumes; leaving on hand 751 volumes.

Vol. XII., containing all the pedigrees recorded in 1895, has been completed, and 148 volumes sent out, leaving on hand 852 volumes.

Vol. XIII. has been completed, and will contain all the pedigrees recorded in 1896, and as in Volume VII. and subsequent volumes, each pedigree can be traced in its entirety by referring to the pedigree of another animal in the same volume, making the volume complete in itself. In this volume the cows are printed under the name of each owner. This plan debars us from numbering the females at the time of recording.

PEDIGREES ON RECORD.

Volume	I. contains	3,304
"	II. "	4,427
"	III "	4,593
"	IV. "	4,957
"	V. "	4,388
"	VI. "	5,904
"	VII. "	4,954
"	VIII. "	4,024
"	IX. "	3,633
"	X. "	3,669
"	XI. "	3,213
"	XII. "	3,148
"	XIII. will contain about	3,000
		53,214

NUMBER OF MEMBERS FROM INCEPTION TO DATE.

—	New.	Resigned and lapsed.	Not paid.	Paid.	Total paid.
B. A., 1882	164	.....	.....	164	164
" 1883	73	.....	.....	164	237
" 1884	42	.....	.....	173	215
" 1885	39	.....	.....	187	220
Dom. S. H. B. Asso., 1886	215	37	8	195	410
" " 1887	80	54	81	357	437
" " 1888	46	79	69	388	434
" " 1889	36	37	91	398	434
" " 1890	29	33	74	405	434
" " 1891	32	67	59	365	397
" " 1892	60	22	47	398	458
" " 1893	49	38	72	349	398
" " 1894	66	72	88	318	384
" " 1895	60	.....	.....	290	350
" " 1896	109	41	77	315	424

This table shows that our paid-up membership roll has increased 74 in the last year in total numbers. Our income from members' fees for 1896 was $1,289.

OFFICE WORK.

The back work in concluding Volume XI. was concluded in February, and in March it was sent out to subscribers, and at that time there were 807 bulls' and about as many cows' pedigrees missing. Volume XII. was immediately commenced, and finished about the first of October, and mailed to subscribers. One hundred pedigrees of bulls, and about the same number of cows, that should have been in Volume XI. are in Volume XII., but there are still a great many missing—the result of the late fire. We hope that all breeders who have not as yet sent them in will do so.

The XIII. Volume was closed on the 31st of December last. It contains the pedigrees recorded in 1896. We are now taking entries for Volume XIV.

At a meeting of the Executive Committee of this Association, held on the 5th of December, 1895, the financial position was fully considered, and it was thought desirable, owing to the continued prosperity of the Association, to alleviate the cost of registration

to the breeders of Shorthorns as much as possible for the future; so a resolution was passed lowering the annual fee to three dollars, commencing on the 1st of January, 1896, instead of four dollars, as heretofore. Also, to lower the penalty fees for animals over eighteen months of age, to members twenty-five cents, and to non-members fifty cents, so that after that date members will be charged one dollar, and non-members one dollar and seventy five cents, instead of the present rates. The rates for animals under eighteen months continue as before, seventy-five cents to members, and one dollar and seventy-five cents to non members.

A list of errors is made in each volume, which should be marked in red ink in the volume mentioned. We also hope breeders will furnish us with any catalogues of sale that may be made during the year.

Your Committee would call particular attention to the rule requiring all calves born after the first of January, 1889, to be recorded before they are twenty-four months old. A penalty fee will be charged after that date. Attention is also called to the clause in the Constitution which requires that "a member must pay up all his fees in arrears before he can resign."

Since the last meeting we have received the XL. Volume of the American Herd Book and the XLII. Volume of Coate's Herd Book as exchanges.

Extracts from By-laws.

Section 1.—Persons desirous of becoming members shall so notify the Secretary, pay the entrance fee, and agree, if elected, to conform to the rules of the Association, and not to withdraw without paying all fees due, and giving three months' notice of their intention of doing so.

Section 2.—Members shall pay an entrance fee of $3, and subsequently an annual subscription of $3, which annual subscription shall be due and payable on the first of January of each year.

New By-law.—That all calves dropped after January 1st, 1889, shall in future be registered within twenty-four months of birth, and if not so registered, enlarged fees shall be charged for their registration.

Section 15—Fees.—Charges for registration will be:

To members, registration and certificate	$0 75	for each animal.
To non-members, registration and certificate	1 25	"
Over age, to members (in all cases a certificate goes with registration)	1 00	"
Over age, to non-members (in all cases a certificate goes with registration)	1 75	"
Change of ownership	25	
Duplicate certificate	25	
Back volumes of Herd Books, each	2 00	

HENRY WADE,
Secretary.

RESOLUTIONS.

The following resolutions which were drawn up at the Directors' meeting were confirmed by the members present:

Moved by C. M. Simmons, seconded by W. G. Pettit, that the sum of $110, paid to the Fat Stock Show for 1896 be approved of. Carried.

Moved by W. G. PETTIT, seconded by JAS. RUSSELL, that the notice of motion given last year to have the date of over age animals extended from eighteen months to two years, come into force immediately. Carried unanimously.

Moved by JAS. TOLTON, seconded by C. M. SIMMONS, that in case the Prince of Wales' Prize Money be given to the Shorthorn Breeders' Association, that it be given to a bull and four females under two years old, bred by exhibitor. Carried.

Moved by Dr. PATTON, seconded by JOHN I. HOBSON, that the sum of $300 be put into the hands of the Executive Committee, with instructions to award $150 to the Fat Stock Show in Ontario, wherever held, and the other $150 be placed as they think best on Canadian Shorthorns, or Shorthorn grades winning at the Chicago Fat Stock Show. Carried.

Moved by Mr. H. SMITH, seconded by Mr. JOHN DAVIDSON, that the sum of $100 be placed in the hands of the Executive Committee to duplicate prizes in the dairy department offered by the different Fair Boards, if won by Shorthorns. Carried.

Mr. T. C. PATTESON expressed his pleasure at being present. He said there were no recruits coming into the ranks; at present he knew of a few going out, but heard of no young men coming in. There were too many people who made money, wealthy men, going into the Shorthorn business. It has always been the case in every country. He hoped there would soon be a turn for the better. He was also glad to see that animals ten years ago that were judged by their pedigree, were now judged by quality. It was a very desirable thing to keep up these pedigrees, but he was glad the time has come when an animal is judged more on its individual merits than on its pedigree.

Mr. HOBSON: I think Mr. Patteson left out one of the best arguments in favor of the rich men coming into agriculture. It always strikes me there is perhaps no better safety valve for rich men than going into agriculture, as it will keep them from getting too rich. Another way of looking at it is, in this age in which the socialistic element is getting so strong, there is no better means of getting an even distribution of wealth. If these wealthy men keep at it long enough it will result in a large distribution of wealth throughout the Province.

Mr. JOHNSTON also thought the wealthy men of the country should take a greater interest in the farming community and spend more money with them. He alluded to the Royal Show in England, saying, if you went there you were liable to meet a thousand of the greatest men in England with actual practice in farming.

FINANCIAL STATEMENT.

Receipts.

1896.			
Jan. 1.	Cash on hand		$4,786 54
Dec. 31.	315 yearly subscribers		962 00
	109 new subscribers		327 00
	Registration fees		2,958 96
	Interest		155 39
	Herd Books		17 50
			$9,207 39

Expenditure.

1896.			
Dec. 31.	By allowance for work after fire.		$ 75 00
	Rent of hall and insurance		63 50
	Registration fees returned		19 00
	Printing and stationery		178 70
	Postage		210 74
	Auditor and stenographer		57 00
	Committee's expenses		95 05
	Herd Books, Vol. XI.		974 63
	Herd Books, Vol XII		1,234 32
	Prizes fat stock show		110 10
	Secretary's commission on 2,956 pedigrees	$960 70	
	442 transfers	44 20	
			1,004 90
	Cash on hand		5,184 55
			$9,207 39

Assets.		*Liabilities.*	
1896.		1896	
Dec. 31. To cash	$5,184 55	Dec. 31. By balance	$12,885 55
Office furniture, books, etc	150 00		
Vol. I. D.H.B. 96 copies.	144 00		
" II. " 292 "	438 00		
" III. " 392 "	588 00		
" IV. " 387 "	580 50		
" V. " 377 "	565 50		
" VI. " 373 "	559 50		
" VII. " 379 "	418 50		
" VIII. " 335 "	502 50		
" IX. " 325 "	487 50		
" X. " 575 "	862 50		
" XI. " 751 "	1,126 50		
" XII " 852 "	1,278 00		
	$12,885 55		$12,885 55

I hereby certify that I have examined the books and accounts of the Dominion Shorthorn Breeders' Association for the year ending 31st December, 1896, and that the above statement is in accordance with the same.

CHAS. F. COMPLIN,
Auditor.

TORONTO, January 13th, 1897.

RAILWAY TRANSPORTATION.

The President then read the following letter, which he had written to G. M. Bosworth, Esq, general freight and traffic manager of the C. P. R., in reference to the classification of animals being shipped:

G. M. BOSWORTH, ESQ.,
General Freight Traffic Manager C. P. R , Montreal, P. Q.

DEAR SIR,—I have been requested by Mr. John I. Hobson, President of the Cattle Breeders' Association, to write you, setting forth the grievances complained of by shippers of cattle intended for breeding purposes.

First. I may say that we are satisfied with the estimated weights of calves (of both sex), under six months old, at 500 lbs., and also calves over six months and under twelve months old, at 1,000 lbs., though they are in both cases much over the actual weights.

Second. We think 3,000 lbs. an exceedingly unreasonable estimated weight for a young bull of over one year, and under two years. For example: A ships a young bull aged eleven months, and say, 29 days, and his estimated weight is 1,000 lbs. B ships on same day, from same station, and to same destination, a young bull aged twelve months, and say, one day, and his estimated weight would be 3,000 lbs.—exactly three times as much as A's bull, or in other words, B pays exactly three times as much as A pays, though his young bull is only three days older than A's, and perhaps not any larger, if as large, and certainly no more trouble or risk to the R. R. Company. We ask you to reduce the estimated weights of bulls between one and two years, from 3,000 lbs. to 2,000 lbs., and even then they will be high.

Third. We think 4,000 lbs. a very much too great an estimated weight for bulls over two years old. We suggest 2,500 lbs. The present rating has almost, if not entirely stopped the sale of aged bulls for breeding purposes, when the owners require their services no longer, and this is a very great loss to the county as well as to the breeders, because the usefulness of some of the very best bulls is thus entirely lost.

Fourth. We think that 2,000 lbs. for a heifer over one year and under two years, is entirely too great an estimated weight. We suggest 1,500 lbs. for such an animal, though few of them would exceed half of that weight—cows at 2,000 lbs. we do not consider unreasonable.

Fifth. Thus far I have been discussing estimated weights of single animals. We think that when two or more young bulls are shipped in the same car, and to the same destination there ought to be a similar grouping and reduction of weights as in the case of cows so shipped.

Sixth. We think that charges per 100 lbs. are excessive and not in the interest of the R. R. Companies, because anything tending to lessen the production and distribution of these pure-bred bulls, tends to limit the number and quality of shipping bullocks in the country.

Seventh. We count the regulation requiring a man to go in charge of animals shipped over 100 miles an intolerable tax, as business is at the present time, and even the concesion granted last summer, by which this may, in some cases be avoided, does not work satisfactorly, as some breeders do not know about it, and principally because it is sometimes necessary to ship on short notice, and the local freight agent cannot be reached in time. Indeed I have twice failed to get any reply from the local freight agents. This "*man in charge*" is perhaps the greatest grievance we have to complain of, though in my case it has not been enforced recently.

We, as breeders and distributors of pure-bred stock have always considered ourselves overcharged and over-weighted by the railways, but we did not feel like complaining while prices were good or fairly remunerative. Now, however, we get such miserable prices from the improverished farmers, that we feel every overcharge a burthen. We claim, and believe, that we have been doing a good—indeed a great public good—though aiming at our own interests, in breeding and distributing these pure-bred animals all over the country to improve the farmer's stock, and I may here say that hundreds of breeders have been forced to quit the business because it was losing them money every year. I might also say that there is a general complaint among dealers, as well as among farmers, that the bullocks now in the country are not as good as they were years ago. This is partly due to the curtailment of the number of good young bulls bred and distributed, and perhaps in a greater degree to the recent growth of the butter and cheese industries. At any rate there is no interest in the country that has more to loose by any deterioration, or curtailment of the number of first-class bulls sent forth to produce the shipping bullocks of the country than the railway companies. I trust that you in conjunction with Mr. Reeves will see your way clear to give us the changes herein indicated. They are changes demanded by the combined cattle breeding interests of the Dominion, and Mr. Hobson and myself were named a deputation to wait on both companies to endeavor to get relief in this direction; and without wishing to be disagreeable I assure you that agitation will continue until there is some change made.

Yours very respectfully,

ARTHUR JOHNSTON,

President of the Dominion Shorthorn Cattle Breeders' Association.

The PRESIDENT then explained to the members present that the railway companies would now send a single animal over a hundred miles without an attendant, if the shipper felt disposed to send it alone, and this is the result of a great deal of labor and correspondence with the railways which we had entered into last year. He also said that the railway authorities are in consultation, and now endeavoring to come at a more just scale of charges on cattle, and he believed there would be a revision soon of wonderful importance, and this revision will be in favor of shippers.

A RETROSPECT.

By Richard Gibson, Delaware.

"Watchman tell us of the night?"
"Cloudy overhead but bright and clear in the East.
And alls well."

By this quaint illustration from olden days custom, may we, not inaptly, describe the present condition of the Shorthorn interest. It is without doubt cloudy "but alls well"—and I think if we take a retrospect of the last year's operations there may be lessons learned which may not only prove interesting and instructive, but also profitable.

In the first place it is "bright and clear in the East." If we will consider the situation in England we must confess the outlook is decidedly bright. Prices have been fully maintained—two notable sales have taken place, at each of which higher prices were realized than for some time, while the high water mark for years past has again been reached, that of one thousand guineas or five thousand dollars. Again has South America been the principal purchaser, not only in numbers but also quality; the very best that could be purchased have been secured, and price, apparently, was not thought of so long as they were enabled to get the best.

In connection with this trade there are some facts to which I wish to direct your thoughts. The first is in the continued demand for bulls. Last year in drawing your attention to the fact I asked "Can nothing be done to get a slice of this trade? Surely our climate, the crops, and the amount of sunshine, must more nearly assimilate with that of Argentina than does that of England, upon whose domain the poet informs us the sun never sets. Yet for weeks and weeks together in the tight little isle she fails to rise at least to the naked eye. It may be urged you have not the stock. My reply is there are no Shorthorns worth buying in England or Scotland for which we cannnot claim kinship for some of ours. Moveover I make this startling statement that whereas $7,500 is the most that has been paid for one animal as far as I am aware to come to the North America continent, $35,000 has been paid by Englishmen for one breed here, and for years England's breeders came here for their bulls; so that argument does not hold good.

It had been anticipated when last I addressed you that the Government of the day contemplated getting closer in touch with the stock breeders by appointing one who knew their wants, and who was, as it might be, one of themselves with whom to consult, etc. It seems to me as though one of the duties of such an appointee would be to enquire into the condition of foreign markets, and the chance of securing an outlet for our surplus cattle, sheep and horses. It is a matter with which private enterprise, as far as our breeders are concerned, can scarcely attempt. We have been so heavily handicapped of late that but few can afford to grapple with the question single-handed. The thought arises would it be advisable to divert a small sum from the surplus of the Association towards assisting to ascertain cost of transportation, facilities of shipping, and best course to be pursued towards getting a footing.

Secondly: That most of these bulls are being bought to get steers, and so successfully have they been used that the steers shipped to the English markets compare favorably with ours, so that if we expect to be in the race at all it behoves our steer breeders to be aware to the fact that $50 bulls cannot compete with $500 ones as steer getters, and that they must buy better bulls and be prepared to pay the breeders correspondingly high prices.

Thirdly: If these South American Republics with their depreciated currency and with the consequent big premiums on gold can pay such prices, are we to assume they could pay bigger if their national finances were on a sounder foundation. I am not a silverite, but I am almost persuaded when I see such results, and more than a passing thought is due.

Another phase of the English situation is the interest taken in the dairy Shorthorn, and there is evidence that a boom in that direction is at hand, and so persistent are the believers in the value of the Shorthorn as a dairy animal that there are heard mutterings of a break from the parent society, and the establishment of a new record, even as the breeders of the Lincolnshire reds have done.

The views of Mr. Bates are gradually being more and more impressed on the breeders of England. "That milk, butter, and even cheese were of almost equal importance with beef in the selection of a breed cattle."

Turning to ourselves "Cloudy overhead, but clear in the East"—may pretty well accurately describe our situation. Cloudy indeed, but I believe the god of morn is surely rising high in the East and dispelling those clouds. The first rift I note is the assurance that quarantine is to be removed. No such calamitous blow was ever dealt at the cattle industry than the quarantine and the tuberculine combination. It paralyzed the breeder's efforts, destroyed his enterprise and circumscribed his territory.

Fresh blood may now be instilled in our herds, and the race for England's markets with South America is made more equal, and with the establishment of the dead meat trade, I see the clouds rising higher and higher and the golden lining appear. And with a free field we ask no favors. Though Argentina may have a kinder climate we can more than offset that by the skill and perseverance of our breeders; though the United States may have a luxuriant corn belt and naturally many advantages, still, we have our root crop to counterbalance, and our people are more thorough in their methods and management; and though handicapped in many ways we hesitate not to enter into friendly rivalry with them. And now that the clogs of our industry are likely to be removed I hope you each may feel as sanguine as I do, and that at our next annual meeting you may echo the watchman of old's cry:—"All's well, All's well."

Mr Hobson did not think there was any use discussing this South American trade unless there was some line of business between the two countries.

Mr. Wm. Linton thought it was a matter this Association should look into, and if there were any ships going to these South American Republics we should wait on the Government and see if something could not be done in the way of getting a market down there.

It was moved by Robt. Miller, seconded by John Davidson, that a vote of thanks be tendered Mr. Gibson for his instructive paper, and that it be left in the hands of the executive committee to take any action they see proper. Carried.

WHY DO WE BREED SHORTHORNS?

By A. W. Smith, Maple Lodge.

To this question probably almost every breeder would answer "To make money," and no doubt quite correctly, and yet the breeder who is in the business simply to make money is seldom a success as a breeder, and almost an injury to the breed. The most successful breeders have doubtless helped themselves to eminence by having in view the profitableness of the type for which they were striving, as for instance, Bates, with his beautiful, graceful, broad-backed favorites always giving the owner a handsome profit through the dairy aside from the great improvement in the beefing qualities of the cattle, the result of their cross upon the ordinary cattle of the country. The Booths and those breeding to their type made fortune as well as fame with their grand, large, heavy-fleshed cattle, selling profitably then because of their massiveness and readiness to fatten.

And again the Scottish breeders with Cruickshanks in the lead, after years of patient perseverance, won abundant reward for producing still another and different

type, one which following those already mentioned and filling in a necessary quality to suit the change in demand, building up a smaller class of cattle, maturing quickly and proving profitable almost whenever used judiciously.

And the breeders of to-day, who, casting aside all false prejudice to pedigree, gather the best from the fruit of the labor of all these great benefactors of the breed; and as the master artist, with a few bold strokes of the brush produces a picture which captivates the world, so these breeders produce the type of beast which will bring a full ripe carcase of beef of good size with a massive appearance at an age unthought of in the earlier days of the breed, possessing milking qualities to recommend them as the cattle for the general farmer, and stamped with that grace and carriage necessary in the successful show animal of to-day. These breeders attain to an ideal type that is higher than that of the past, and leave more profit than is possible to the man who is breeding simply for the money there is in it.

All these breeders have worked and thought and waited for the realization of a desire to produce a type approaching more or less closely to an ideal animal, produced, first in their own imagination, and willing to accept such profit—though sometimes small—which is sure to follow. They are always a benefit to the breed.

On the other hand, then, is the speculating capitalist, who may invest largely in Shorthorns (a benefit to some individual breeder very often I will admit) as has been done so frequently in the past, and then breed simply on paper or from pedigree, and whose highest ambition as to improvement may be to "corner" some family or strain of blood, and by systematic booming force them up in price. Then having made them fashionable, if he be adroit and does not foolishly imagine himself a breeder in the bet sense, he will sell out, making some money, but seventy-five per cent. of the purchasers will lose. The result is injurious, and sometimes almost disastrous to the breed.

A more numerous class of breeders at the present time, as well as the past, and whose injury to the breed is now far reaching, is composed of those men, who, being quick to follow in the wake of other men, who to them seem to be making money, perhaps see bull calves selling for $100 or over, and counting a clear profit of $75 or $80 over the steers they have been raising, purchase a cow or two. Then, without any idea of the animal they wish to breed, they simply have the cows raise calves. They may be very inferior, of a type likely to be avoided altogether by the skilful breeder, yet they expect their calves to sell for $100, and of course they are disappointed. They forget that they have not purchased the skill and experience of a successful breeder, that they have not, as he very often has done, patiently for years sold his surplus for one-half the price he now gets, yet determinedly breeding for the improved type he has in view.

This class of breeders become disgusted with the breed, and not because of any fault of that breed, but because of error in their own judgment, and being dissatisfied generally rid themselves as quickly as possible of what they consider a losing property. Or worse, they allow them to degenerate through continued ill-mating and carelessness, and then denounce the result or effect as the cause of that same result, and through citing their disappointment cause further injury to the breed by discouraging men who would be a benefit to the breed and a credit to the ranks of the breeders from investing, as they would, because of their natural love for a good and comely beast that they can raise with reasonable promise of profit and shape to their own taste, always being a source of profit as well to the established breeder.

Moved by JOHN I. HOBSON, seconded by ROBT. MILLER, that a vote of thanks be tendered Mr. Smith for his valuable paper.

Mr. A. JOHNSTON: In reference to the through car business, I am glad to say to any gentlemen here who have sold or who are selling animals to go to the North-West, an arrangement has been made for a car to start at a time that will be suitable to the greatest number of people. At the present time there is a rate offered of only $5 per head for a good carload of bulls to go to Manitoba, so if any of you have animals to go there, now would be the time to send them and take advantage of this rate. I do not say this will

be the only charge, as there may be some other paltry charge; but the charge to send an animal to the North-West will be insignificant. I think to take a carload up there is about $70.

Mr. Hobson also spoke briefly on the cheap rate of transport to the North-west, saying he thought the rates were very low, and it was for the breeders of this Province now to take advantage of these rates and ship their animals up there, where there was a very good market.

The President then called upon Mr. David Rae, and Mr. Rae said he was glad to see such a valuable work being done by this Association. He was pleased to see they had secured such low rates of transportation of young stock to the North-West, where it is so much needed, and which will ultimately be such a great market for the breeders of this Province. He, although practically out of breeding and importing, was still interested in the breeding of Shorthorns, as that was the breed of animals for profit and it was for profit they were bred. It has been stated in one of the papers read that men want to breed for another object, and that is perfectly true; every breeder wants to be an enthusiast. Every man, whether engaged in Shorthorns or any other business, ought to be enthusiastic. He also spoke encouragingly of the Shorthorns, and the men among the ranks of the Shorthorn breeders who were standing out prominently. The day would yet come when some of our Canadian breeders would breed animals as good as any in Scotland or Great Britain, and possibly surpass those that have been bred by Bates, Booth or Cruickshanks, so let each one set to work enthusiastically and aim for an ideal higher than has ever yet been produced.

ADDRESS.

By Hon. John Dryden, Minister of Agriculture, Toronto.

As a very old member of this Association, I am very glad to be with you a little while this afternoon. I wish to congratulate you on the success of this organization. I have just picked up a financial statement, and I observe that the condition is rather different to what it was in olden days, when some of us had to struggle for an existence. I see you have the modest sum of upwards of $5,000 on hand, and I presume those of you who have charge of this work will begin very soon to devise some scheme to use a portion of this money to bring our cattle to the front more than in the past.

I may say, it might be a desirable thing at the present juncture to reduce the fees of registration much more than they are, which undoubtedly would be the means of more breeders in our country registering, and you have a surplus on hand sufficiently large to do this. At all events, this large surplus indicates that Shorthorns are not going out in this country.

I would like to speak personally as regards the Shorthorns, but officially, as Minister of Agriculture, I should not undertake to designate between one breed or the other. However, without depreciating the value of other breeds of cattle, I think this North American continent could not do without the old reliable Shorthorns. (Hear, hear.) We, all of us, must come to the conclusion that it is to the Shorthorn more than any other breed that we owe the reputation we have of our export cattle going abroad. And the only thing troubling me is, that in the introducing of dairy breeds of cattle for the production of dairy produce, such as butter and cheese, you are liable to mix these with other beef breeds to such an extent that when your steers are presented for export trade they do not come up to the standard required. It is a difficult point to overcome very well, but our people must have freedom to overcome these matters by going abroad for new blood.

Now, I have often said in speaking before this Association that to do the best for ourselves we must have a wide, extensive market. It does happen—and the reason why I cannot say—that one sometimes finds the best sales outside of his own community. At

all events, it is necessary, if we keep up our herds to the very best advantage, that we must have the liberty to go abroad where we can find the particular article to suit our particular purpose; and every individual breeder ought to understand his own wants and fill them independently of anybody else, and use his own judgment rather than the caprices or notions which somebody else has set up. The men in the old land who made reputations for themselves made them because they had followed their own judgment, and had not accepted the precedents established by someone else. And I believe if the breeders in our own land would follow them a little more along that line, exercise their own judgment and keep before them certain definite ideas, it would be much better for the interests of our cattle in general.

Now, in order to do that we have felt it desirable sometimes to go into the United States, sometimes to the old land for a little change of blood. I heard a gentleman say, who has a right to speak among the American breeders to-day, there is, and there will be in the future, a strong demand for new blood; that they must go outside of their own country to get it; so they will either have to come here or go to the old land, where we sometimes are inclined to go to get renewals which we so much require.

Now, you know between these two countries, between ourselves and England, and between here and the United States, there has been a wall which was practically impossible to get over. It has not been enough, three months' quarantine—we have, all of us, got over that—but there has been in addition to that another obstacle in the form of a law between Canada and the United States, and Canada and the old land, that every animal crossing is subjected to a tuberculine test. They must have a clean bill as far as tuberculosis is concerned. Now, what does that mean? It is that this test is applied to an animal when it arrives in our country. I have in my mind to bring a few animals, as the case may be, from Scotland. Now I have to invest my money 50 or 80 guineas. I have to pay the freight to bring the animals into my own country and stand the test, and if they do not stand the test, then the cattle must be destroyed, and I lose all I have paid out without the opportunity of getting the new blood I have spoken of. Now, this is too great a risk, and I have felt all along that this was a harsh arrangement and should be done away with.

However, as you know, the quarantine between here and the United States has been removed, but when breeders come to understand the conditions, they will not feel so elated as at first. The authorities have removed the ninety days' quarantine between here and the United States, both ways; but by statutes made an animal cannot get into this country without being subjected to this test; nor can an animal get into the United States without being subjected to the test. There is a mutual arrangement between the two countries in this regard, and the only advantage we have in regard to it is the arrangement by which they will accept our certificates of test given by properly appointed officers on this side, and our Government agrees to take them from the other side. That means that if you sell an animal to go to the United States, you can have it tested in your own stable without undertaking the transport to the United States, and then destroy it if not qualified; but if your animal stood the test, then, of course, that is of very great advantage.

I apprehend the American authorities will not accept the certificates from ordinary veterinary surgeons. These veterinary surgeons who are appointed for this purpose must have the endorsement of the authorities, and if any of these men should make a mistake or undertake to deceive the authorities, and they find it out, I contend the whole thing would be broken up. It is a very delicate position in which we are placed just at the present moment. I may say to you, if it would not be telling any secrets, that while in Washington, I used all the influence I was capable of to prevent this test being applied, but the replies I received showed that there was little chance of it being abolished. I said, "You are not accomplishing anything so far as ridding yourself of the disease when you merely prevent the animal coming in from outside." My objection did not have much force on a Government that had this test applied for three or four years. And besides that, some of the States in the Union were undertaking themselves to stamp out this disease; they have quarantine against some of the other States. And one gentleman in authority in Washing-

ton said it is not fair for you to ask us to allow outside animals to come into one of these States that had quarantine against some of the others without subjecting them to the same test that the authorities of some of the States require before they can pass through It is a pretty hard argument to get over, and the result still remains to be seen.

Now, what I would like to discuss is, what is the best thing to be done. When I got home from Washington, I immediately gave orders that the Departmental bacteriologist at the Agricultural College be sent to Washington to ascertain whether it was possible for our authorities at Guelph to manufacture tuberculin in this Province. It is now manufactured in this country; we have been sending to Germany largely. It is manufactured in Washington, but we do not feel like going over there and asking them for it, so we are undertaking to manufacture it ourselves. I have discovered we can do it by spending a few hundred dollars.

Well, having that done, it will then be open for any of you gentlemen, whether you make a sale or not, to ask for the use of some of this material to test for yourselves. It is my own judgment that is what should be done; and, looking at the question from all sides, it will be a desirable thing to realize on what expenditure we have had, and take such means as will free our herds from the disease. I have no doubt under some circumstances it is contagious, and under some circumstances it is not contagious. It is not such a terrible thing as some people try to make us believe; at the same time, it is desirable now, seeing this order is going to stand, to take some means to rid ourselves of any disease that may exist.

Sometimes when I am being introduced, by error they call me the Minister of Education, and I might say I am Minister of Education in Agriculture. It is agricultural education I am attempting all the time. Now, cannot we commence a little education along this line? Suppose we take our Professor of Veterinary Science at the College and give him authority to test to ascertain the condition of animals. Let it be said to Mr. Miller or to the President: "Now, if you want the services of this man confidentially, if you have sold any animals that are going outside, we will send him free of expense and allow you to have him make the test." Nothing has been done in this direction, but these things have come up in our minds, and the point is, will the breeders avail themselves of his services? I confess there are some veterinaries who whisper, and suspicion is worse than facts. It becomes whispered around that a veterinary was inspecting your herd and although your animals may be perfectly healthy, the fact that the veterinary does not tell them he has found something is taken for granted he has and, of course, that goes abroad among the people, and it has a tendency to raise suspicion. At the same time, somebody has got to commence this work, or the disease, where it does exist, will never be got rid of.

I feel if we had some confidential man who would understand this we might start an educational process, because if Mr. Linton had an examination made, and found two or three of his animals responded to this test, he would feel in justice to himself, that these animals should be got rid of, and if that was done in one case, it would be done in another, and thus all through the country. And I want to say here, where tuberculosis is to be found you will only find a grain of it among the herds of the gentlemen to whom I am speaking to now compared with other breeders. Therefore, if these lines were followed out, little by little the educational work would go on; and I have suggested to Mr. Fisher the desirability of providing some proper description of the disease and of the plan of action to be pursued in order to rid the herds of the little disease that might be found, but I think that all the evidence goes to show that it does not largely exist in this country.

I was talking to Mr. Wadsworth, a prominent member of the House of Representatives who deals in Canadian cattle, and he claims we have as healthy cattle on this North American continent as can be found anywhere, and we can raise better cattle, more thrifty and healthy than Ireland or England. At the same time here we are face to face with this difficulty.

The Dominion law has now placed tuberculosis on the list of contagious diseases in the Act, and you are not allowed, if you know an animal has the disease named in that Statute, to sell it under extreme penalty. You have got to get rid of it.

Supposing then, under these circumstances, you apply the test which has been suggested, and two or three of your animals respond to it. Now these animals may be quite sound and healthy, as has been shown by Dr. Smith in a recent examination, in which the animal tested gave a high reaction, and by the test of the microscope showed no germ of the disease. But the gentleman who made the test said that when he put one of the glands taken from the neck of one of the animals under a very powerful microscope, he found the germ. I suppose he was bound to find it any way.

Well, the point is this. It is pretty hard to be compelled to shoot an animal like that and bury it in the ground. It is just as good for beef as any other animal you have. But supposing you sell an animal in this condition, are you not doing it under this penalty? Would you dare to sell an animal you knew to be diseased? And so I said to Mr. Fisher the other day that the law should be altered. I am trying to do things along the lines I have suggested, and wish to have everything put in such a position so as not to jeopardize the breeders; and I am expecting there will be a change; and that law ought to be changed.

This is my object in coming here to-day, to present to you this matter, and I would be very glad if any of the gentlemen here would let me know their opinion on it It would be a very much more convenient matter if the breeders in the different parts of the Province would name competent authorities to undertake this work of testing the cattle. If you have animals destroyed or turned back to you, you know what that means; that settles your whole herd. It is a very delicate situation we are placed in. But I am sure if the breeders will try and follow out what has been suggested we can keep our herds healthy.

I do not wish to take the people by the throat and send men all over the country with their little squirt guns. I feel the stock men would rise up in rebellion. I do not want to be understood saying anything like that; but I want to rid the country of any disease that might exist. We must not injure men who have devoted their whole life to this work as far as cattle are concerned, and the interests of these men must not be put in jeopardy. Now what exactly will be done I am not prepared to say. I presume we will manufacture tuberculine at Guelph and also at McGill University, and it will likely be used extensively before many years go by. More education is needed along this line, and it seems to me that is all that is required.

MEETING OF EXECUTIVE COMMITTEE.

Meeting of the Executive Committee of the Dominion Short Horn Breeders' Association at the Palmer House, Toronto, on Tuesday, the 23rd of March, at 4 p.m.

Present: A. Johnston, Greenwood; John I. Hobson, Guelph; Robt. Miller, Brougham; Wm. Linton, Aurora, and H. Wade.

The Chairman explained that $300 had been voted by the Short Horn Association at the last annual meeting, to be awarded in premiums by this committee on certain lines.

It was resolved that out of this amount, that $120 be given to the Provincial Fat Stock Show, to duplicate the premiums on pure-bred steers; also that $20 be given as a Championship prize to the best grade steer (sired by a pure Short Horn bull) on the ground.

It was also resolved that a number of herd prizes be offered by this Association in the different provinces, viz: For the best bull and four females under two years of age

owned by the exhibitor. Certificate of registration in the Dominion Short Horn Herd Book to be produced for each animal.

Quebec	$25 00
New Brunswick	25 00
Nova Scotia	25 00
Manitoba	25 00
Ontario : Toronto	20 00
London	20 00
Ottawa	20 00

It was also decided to duplicate the prizes to Short Horn cows in the milk test amounting to $100.00.

TENTH ANNUAL REPORT

OF THE

DOMINION AYRSHIRE BREEDERS' ASSOCIATION.

LIST OF MEMBERS FOR 1897.

Agur, Thomas G	Hollen.
Anderson, J	Crossland.
Archibald, C. A	Truro, N.S.
Balduck, Wm	Mt. Charles.
Ballantyne, T. & Son	Stratford.
Blanchard, Thos. H	Belleville.
Bogart, J. W	Morewood.
Bonnell, C. E., M.D	Bobcaygeon.
Brooks, R. S	Brantford.
Callander, Jas	North Gower.
Cairuthers, J. B	Kingston.
Campbell, John R	Vernon
Central Ex. Farm	Ottawa.
Clark, J. G	Oshawa.
Crosby, John	Campbelford.
Cummings, A. J	Heckston.
Cunningham, John	Norval.
Douglas, John H	Warkworth.
Davies, Robb	Toronto.
Eaglesham, Wm	Fulton Mills.
Easton, Ed. H	Lyn.
Edwards, W. C., & Co	Rockland.
Empey, M. N	Napanee.
Eyre, H. E	Harlem.
Hume, Alex., & Co	Burnbrae.
Harrison, R	Avonroy.
Inch, Frank	Kerwood.
James, J. A	Nilestown.
Johnston, F. K	Bickford.
Kains Bros	Byron.
Keeble, Geo	Brandon, Man.
Kennedy, John	Billing's Bridge.
Kinsay, Jos	Doon.
Klock, R. H., & Co	Klock's Mills.
Knight, Jonathan	Elginburg.
Laurie, John	Malvern.
Martin, John	Lucknow.
Mielick, Aaron	Smithville.
Moote, Robt	Rosedene.
Murphy, R. G	Elgin.
McCormick, Jas	Rockton.
McElroy, S. J	Bendley.
Nichol, Walter	Plattsville.
Nott, Chas. A	Norwich.
Oliver, Adams	Motherwell.
Ontario Agricultural College	Guelph.
Philip, Thos	N. Dakota, U. S.
Rathburn Co	Deseronto.
Reid, R., & Co	Wintonburg.
Ritchie, Jas	Lariviere, Man.
Robertson, Alex	Maitland.
Simpson, Jas	Brockville.
Smith, W. M. & J. C	Fairfield Plains.
Smith, J. C	Hintonburg.
Sorby, D. & O	Guelph.
Spear, Wm	Cobourg.
Steacey, R. G. & B. D.	Lyn.
Steele Bros	Glenboro', Man.
Stewart, Wm., jr	Menie.
Stirling, T. W	Kelowna, B. C.
Taylor, F. W	Wellman's Corners.
Terrill, A	Wooler.
Well, A. C., & Son	Chilliwack, B. C.
Whelan, J. H	Westport.
Whittaker, H. J	N'th Williamsburg.
Whitton, Jas	Wellmans' Corners.
Williams, Thos., & Sons	North Ridge.
Wood, Andrew	Vankleek Hill.
Wooley, Alex	Springfield.
Yates, Mahlon	Athens.
Yuill, Jas. & Son	Carleton Place.

DOMINION AYRSHIRE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The tenth annual meeting of the Dominion Ayrshire Breeders' Association was held in the Albion Hotel, Toronto, on February 2nd, 1897, at 2 p.m.

The following members were present: W. W. Ballantyne, Stratford; Jos. Yuill, Carleton Place; W. M. Smith, Fairfield Plains; D. W. Green, Toronto; D. P. McKinnon, South Finch; Wm. Baldur, Mount Charles; John Bell, Amber; Arthur Oliver, Hanlan, and Henry Wade, Secretary.

Mr. W. W. Ballantyne, of Stratford, was elected to the chair, owing to the absence of President H. E. Eyre.

PRESIDENT'S ADDRESS.

The following address, forwarded by Mr. Eyre, was read by the Secretary;

It affords me much pleasure to welcome you to this meeting. Time in its never ending flight has brought us again to the end of our breeders' year, and while we have met to close the Associations' affairs for the year and open up business for another term, I hope that we may by friendly discussion and interchange of ideas make this one of the most beneficial meeting we have had. It seems too, that men whose interests are identical, and whose views upon the industrial and economic relations of life are so similar, should have for each other deeper feelings of respect, and be actuated by keener desires for one another's welfare, than what enlivens the breast of a good citizen and enables him to recognize in every son of Adam a brother of the dust. Let us then cultivate such social and fraternal feelings as will enable us to look forward to our annual meetings as almost family reunions as well as necessary business conventions.

Inquiries as to type and type-breeding in the past year have led me to conclude that it would be well for this meeting to appoint some two or three of the more experienced breeders to prepare papers upon breeding to type for our next meeting. I shall reserve my views upon this subject for the discussion upon those anticipated papers.

A letter from Manitoba asks me to formulate the conditions under which sweepstake contests should be conducted. I hope this meeting will pass a resolution on this question. What my correspondent wants is to get the best and most economical producer placed where they belong.

I shall not trouble you about the Herd Book matters, because I believe the registration is now in the hands of an expert who is willing to be guided by practical suggestions from this Association.

In conclusion, I would say that so far as my experience and observation have extended, the Ayrshire is growing in popularity, and the general business depression is the only thing that has kept the prices from increasing in proportion.

As the President's address was not received until after the meeting was over, no action could be taken on the suggestions thrown out.

ANNUAL REPORT OF THE SECRETARY

This Association is now running on its own resources; the registration fees belong to it as well as the members' fees. On the other side, we will have to pay for the printing of the next volume, which should be done at once, as we will have about 1,500 pedigrees ready before the book closes, if we commence at once.

Registrations

We have registered 445 head this year, taking in fees for so doing to the amount of $395, against in 1895, 549 head, or about 100 less. I cannot account for this very well, as more farmers are investing in this breed than formerly. I think if we close the third volume about the 1st of March it would be advisable to send out a circular to breeders to send in all their cattle up to that date in order to have them appear in this volume.

Members.

Fifty-one members have paid their subscriptions, amounting to $153, against fifty-six in 1895, not so bad considering the continued state of depression in the country.

Exhibitions.

Ayrshire cattle was well brought out last fall at the exhibitions, especially in Toronto. In herds there were six exhibitors, viz: Thos. Ballantyne & Son, Stratford, Ont.: R. G. Steacy, Lyn, Ont.; Jas. McCormack & Sons, Rockton; Alex. Hume & Co. Burnbrae; Wm. Stewart & Son, Menie and W. M. & J. C Smith, Fairfield Plains. In a herd of four calves, Mr. A. Terrill, of Wooler, showed in addition to these six, and the animals shown in all the classes were magnificent specimens of this favorite dairy breed. There were only four Ayrshire cows entered at the Winter Dairy Show held in Guelph; they did very well indeed, but another year should bring out many more.

Office Work.

This has been done by contract this year as per arrangement a year ago, and the amount paid out has been for commission, $165.65, the rest of the expenses will be found in the treasurer's statement below, which leaves the handsome sum of $373.04 on hand on the 31st of December last. The services of an expert accountant who was employed by the Shorthorn Breeders' Association was secured to audit the accounts for 1896, as I thought it would be more satisfactory to the Association.

There are still several pedigrees that were lost in the fire in March, 1895, that have not been sent in to be copied. This could be mentioned in the circular, if sent out, to warn people of the closing of the third volume.

We hope that before another year is over that our registration certificates will be recognized by the Customs on the other side of the line, as well as that the quarantine obligations will be done away with.

Henry Wade,
Secretary.

CORRESPONDENCE.

The Secretary then read a letter from Mr. R. G. Steacy, of Lyn, in which the following suggestion was made:

"I regret, owing to business matters of a more pressing nature, I will not be in attendance at the Ayrshire Association meeting. For years we have had our Ayrshire judges picked in Canada. In the interest of all I feel satisfied we should make our choice this year from the United States. If you would consider this agreeable I would mention Mr. Pier, and the Ayrshire judge last fall at Madison Square Garden, New York. I do not know his name. I could procure it for you."

A communication was also read from Mr. William Stewart, jr., of Menie, presenting the following for the consideration of the meeting:

"I may say that I cannot be with you at your annual meeting, as business prevents me at this time; but my heart is with you just the same, and any work you see fit to put upon me I will cheerfully do. I would suggest that the delegates to the Industrial Board should urge the necessity of some more classes added to the list, for instance, bull calves under six months and geld (dry) cows. There should also be a breeders' herd and young herd two years and under. In the cow class many a fine cow is thrown out just because she is not in milk. I also hope that the resolution passed two years ago, requiring all cows to be milked dry on the morning on which they are to be judged will be maintained, as it is most ruinous to a milk cow with a large flow of milk to stand over the most of the day without being milked. If present my vote would go to maintain the resolution.

I have had some correspondence from Quebec desiring the amalgamation of the two Associations which would lessen the expenses, and I think it would be a good move in the right direction, because in unity there is strength. I think also our annual membership is too high. In Quebec they pay $5 to become a member the first year and then annually $1 per year, which I think is quite enough, especially if we were amalgamated. One other thing I have to refer to is the keeping of stock two weeks on the grounds at Toronto. Now this means quite an outlay to the exhibitors, and very little gain to the Society, and I would suggest that we stay at home if they persist in carrying this out or make ample compensation for the time spent. I have further to call your attention to the pedigrees sent in by the gentlemen before referred to, and unless a satisfactory explanation is given to score them out altogether. The demand for Ayrshires is on the increase, and I think there are prospects for quite a trade with the United States in view of the quarantine being abolished."

FINANCIAL STATEMENT FOR THE YEAR ENDING DECEMBER 31ST, 1896.

Receipts.		*Expenditure.*		
To balance on hand January 1st, 1896	$ 73 03	By postage		$ 15 32
" Registration fees	395 00	" Stationery		34 30
" Membership fees, 51 at $3.00	153 00	" Stenographer		4 00
		" Telegrams		57
		" Preparing papers		15 00
		" Committee expenses		13 15
		" Commission on 445 registrations at 35 cents	$159 25	
		" Sixty-four duplicates and transfers at 10 cents	6 40	
				165 65
		" Balance to next year		373 04
	$621 03			$621 03

The foregoing is a correct statement of the financial transactions of the Dominion Ayrshire Breeders' Association according to the books and accounts for the year ending December 31st, 1896.

(Signed) CHAS. F. COMPLIN,
Accountant.

GENERAL DISCUSSION ON ANNUAL REPORT AND COMMUNICATIONS.

W. W. BALLANTYNE: I agree with Mr. Wade in what he says in getting an expert accountant, as it is better for Mr. Wade and better for the Association to have a satisfactory man. I think we should continue to have this expert accountant audit the books instead of appointing members of the Association.

Mr. WADE: Regarding the matter referred to in Mr. Stewart's letter as to lowering the fees, I think it is quite possible we might reduce the annual fee to $2 a year, and by doing so we might get a few more members. I have also had a letter from the Fat Stock Show people to try and give a prize for dairy purposes at the winter show.

Mr. YUILL: There will be little use of giving a dairy prize in Guelph as it was a beef show. I think if they are going to have the Fat Stock Show in the west a dairy show ought to be held in the east.

Mr. WADE explained that they might be able to get a grant from the Dominion Government for a dairy show in the east, but at present all he could hold out was, that every third year the Fat Stock Show which is now held in the west would be held in the east.

Mr. YUILL: I do not like the test by scale of points where prizes are offered.

Mr WADE: Could you make any suggestions as to how the milk should be tested?

Mr. YUILL thought that the way dairy cows were tested at present it was only the animal that could put the largest amount of water into her milk that would take the prize, and he suggested they be also tested for butter-fat and casein—so many points for each.

Mr. BALLANTYNE: You mean to go purely by the Babcock test.

Mr. YUILL: The Babcock test does not allow anything casein—just for butter-fat, and I would suggest to have a test for the casein and ash, not for the water.

Mr. BALLANTYNE: Mr. Yuill is right in his contention.

Mr. YUILL: I do not want to allow anything but what is in the milk.

Mr. BALLANTYNE: I think it would be well for you Mr. Yuill to draw Prof. Day's attention to that; and I think he is on the Fat Stock committee. One thing in the report I notice is: "We hope before another year is over our registrations will be recognized on the other side of the line." Are they not recognized now?

Mr. WADE: You have to record in the American book before you can ship across the line. Our Dominion and Provincial Ministers of Agriculture had an interview with the Secretary of Agriculture at Washington, and Mr. Morton and they expressed themselves as having no objections to our certificates being recognized if the different associations did not object. I have been in communication with the Shorthorn Association in the United States, and they are quite willing that our certificates should be recognized, so I think before long everything will be all right.

Mr. BALLANTYNE: Well, there is one thing I would like to say here, I do not think they will ever take our certificates as long as we have the Appendix in the herd book. They will never recognize our record. I came here to try and throw the Appendix out altogether.

Mr. WADE explained that a great many in the Appendix were just as pure as those in the book proper, only they could not trace them to importation.

Mr. BALLANTYNE said there were a great number of people being fooled by these Appendix animals every day; they bought an animal probably with the understanding that it was in the book proper, but when they come to register it found it was only in the Appendix, and the consequence was they had been breeding from this animal and had lost the whole year's work.

Moved by Jos. YUILL, seconded by W. M. SMITH, that the minutes of the last meeting be taken as read, and that the report be adopted. Carried.

ELECTION OF OFFICERS.

The election of officers resulted as follows :

President : JOHN CROSBY, Campbellford.

First Vice-President : W. M. SMITH, Fairfield Plains.

Second Vice-President for Ontario : A. KAINS, Byron.

Vice-President for Quebec : W. C. EDWARDS, M.P., North Nation Mills.

Vice-President for Manitoba : GEORGE STEELE, Glenboro', Man.

Vice-President for North-West Territories : CLAUDE H. MANNERS, Moosomin, N.W.T.

Vice-President for British Columbia : W. WELLS, Chilliwack, B.C.

Vice-President for Nova Scotia : C. A. ARCHIBALD, Truro, N.S.

Vice-President for Prince Edward Island : C. C. GARDINER, P.E.I.

Directors : WILLIAM STEWART, jr., Menie ; JAS. MCCORMACK, Rockton ; JOS. YUILL, Carleton Place ; R. G. STEACY, Lyn ; J. G. NICHOL, Plattsville ; W. W. BALLANTYNE, Stratford ; WM. BALDOCK, Mount Charles ; J. C. SMITH, Hintonburg ; ROBT. DAVIES, Toronto.

Delegates to Industrial Exhibition : JAS. MCCORMACK, Rockton ; W. W. BALLANTYNE Stratford.

Delegates to Western Fair : A. KAINS, Byron ; M. BALLANTYNE, St. Marys.

Ottawa Exhibition : JOS. YUILL, Carleton Place ; J. C. SMITH, Hintonburg.

Expert Judges : M. BALLANTYNE, St. Marys ; A. KAINS, Byron ; JAMES MCCORMACK Rockton ; H. E. EYRE, Harlem ; JOHN CROSBY, Campbellford ; WM. HUNTER, Lancaster ; W. M. SMITH, Fairfield Plains ; R. G. STEACY, Lyn ; THOS. WHITE, Branchton ; ALEX. HUME, Burnbrae ; JOHN DOUGLAS, Warkworth ; W. HYSLOP, Smith's Falls ; T. M. BELL, St. Marys ; J. G. CLARK, Oshawa.

Auditor : C. F. Complin, London.

RESOLUTIONS.

Moved by W. W. BALLANTYNE, seconded by JOS. YUILL, that a notice of motion hereby be given that at the annual meeting, to take place in 1898, that the membership fee, which is now $3 be reduced to $2. Carried.

Moved by W. W. BALLANTYNE, seconded by JOS. YUILL, that the secretary be authorized to make the best possible terms to print the Third Volume of the Ayrshire Herd Book ; also previous to that to issue a circular to all interested in Ayrshires, stating that the volume will be closed on the 1st of April and that any pedigrees sent in before that time will appear in the Third Volume. Carried.

Moved by W. W. BALLANTYNE, seconded by W. M. Smith, that a notice of motion be given that the Appendix in the Dominion Ayrshire Herd Book be done away with. Carried.

Moved by Mr. BALLANTYNE, seconded by W. M. SMITH, that a prize of $35.00 be given to the best Ayrshire cow at the Fat Stock and Dairy Show, in addition to the prize offered by them, and a further prize of $25.00 in case the sweepstakes is won by an Ayrshire cow. These animals to be recorded in the Dominion Ayrshire Herd Book. Carried.

CARE AND MANAGEMENT OF DAIRY CATTLE.

Mr. Yuill read a practical paper on "The Care and Management of Dairy Cattle." This should commence with the calf at birth. He has a few box stalls, and places his cows in them a week or so before calving. He removes the calf as soon as it is dropped, behind a partition where the cow can lick it, but arranged so that the calf cannot suck its mother. If a cow is in high flesh he reduces her in condition by administering salts both before calving and after. The cow and calf are left in the box stall, with the partition between them, for three days, until all danger from milk fever is over. The calf is given all it can take of the first milking, and the rest is drunk by the cow. If there is any danger of milk fever it is not advisable to milk the cow dry. To test whether the milk is fit for use, heat it in a vessel on the stove; if it thickens when cool it is unfit for use; if no thickening takes place it has got into its normal condition. It should be all right about the eighth milking. When the calf gets only skim milk, which is when it is three weeks old, it is necessary to add something to the milk to make up for the cream removed. Mr. Yuill gives each calf a teaspoonful of flaxseed which has been steeped for 12 hours in a quart of warm water. The seed itself is not given, only the essence. As soon as they show signs of eating he gives them a little hay, which is changed every day if not eaten. Some meal is spread over the bottom of the box not less than twelve inches square. The spreading of it about insures its being better digested than when it is in a heap. As soon as they eat the meal some flaxseed is added, and, later on, a mixture of four pounds oats, two pounds of peas, and one of barley, with its own weight of bran. This is their feed till spring. They then run on grass by day and are kept in at night until the flies get troublesome, when they are allowed out at night and remain in the stable during the heat of the day. His heifers calve when two years old, and every year after.

Mr. Yuill brings his dairy cows into the stable as soon as frost comes, never letting them out once till spring. The morning's milking takes place at 5.15 a.m. The milk is separated while breakfast is going on, one of the members of the family looking after the separating. After that the calves are fed and the cows watered in the stable, and a basketful of cut beaver hay and peas and oats, followed by ensilage, is given to the latter. If the ensilage does not contain much grain some is added, mixed in the same proportions as for the calves. While the cows are feeding the stables are cleaned out. They then remain undisturbed until 3.30 p.m, when they are given a feed of clover hay and rations as in the morning, and again cleaned out. Milking takes place at 5.30 p.m., and the separator is run during the supper hour. After that the calves get their evening meal of milk.

The great secret in attending dairy cattle is punctuality and kindness. Milking takes place on Mr. Yuill's farm at the same hours on Sunday as on week days. No cow repays care and attention better than the Ayrshire cow, although she can stand hardship well.

SIXTH ANNUAL REPORT

OF THE

HEREFORD BREEDERS' ASSOCIATON.

The sixth annual meeting was held in Toronto, on December 10th, 1896.

PRESIDENT'S ADDRESS.

By H. D. Smith, Compton, Que.

The last twelve months have been much more encouraging ones for the Hereford breeder than for some years past. There has been a marked increase in the demand for Herefords at much more satisfactory prices than have been obtained during the previous four or five years, and this little stimulus has caused some of our breeders to put new life into their operations, as was shown by the increased competition and interest displayed at last fall's fairs. Certainly there was a much better turnout of Herefords at Toronto Industrial than we have seen for four or five years back, and I trust next year's fairs will show a still greater improvement.

I might mention here that, through the efforts of our representative on the Toronto Industrial Board, Herefords were given their old place in the Industrial prize list, and the reduction in the prizes of 1895 was again raised to the standard of former years.

While attending Mr. Southam's sale of Herefords, in Missouri, last spring, I was very much pleased to note the growing favor that the Herefords are gaining among the ranch owners of the west. Out of an offering of nineteen young bulls, bought mostly for range purposes, there was an average made of $200.25. Again, this fall, Messrs. Gudgell & Simpson and J. A. Funkhouser, held a sale on a cash basis just the week before the American elections, when money was never more tightly held, and sold twenty-four young Hereford bulls at an average of $196.67. Ranch owners were again prominent buyers. Cull cattle have never been discounted in the American markets, and Canadian markets, too, as they have been the past year, and American ranch owners have realized that they must improve their range cattle. This is what has caused the brisk demand for good young bulls in the States, and the white faces seem to be the favorites for range purposes and are at present bringing the highest prices. While attending the recent New York cattle show, held in the Madison Square Garden, I had the pleasure of meeting several prominent Hereford breeders, and they were all of the opinion that there was a decided shortage in the supply of good young bulls for range purposes, and consequently higher prices are sure to result. I noticed in last week's *Breeders' Gazette* a report of a sale of one hundred high grade Hereford steer calves at $17 per head, off the range. This surely looks as if Herefords were well thought of in the west. These young steers were sold in Colorado and shipped to Illinois, costing the buyer $20 per head delivered there. At the recent New York show Herefords came out with highest honors, the grand championship prize for best beef, any breed, age or sex, being won by Mr. Van Natta's yearling Hereford steer. My own experience this last year assures me that there is a growing demand for good Hereford bulls, and a demand that cannot be met at present, as there are not enough good Hereford bulls in Canada to supply that demand. My bulls of last year sold readily at twenty-five per cent. better prices than during the years 1893 and 1894, and are now bringing still better prices. The only trouble I have to find with Herefords at present is that I haven't enough of them. How many of you are in the

same fix now? Sold the "good ones" for beef prices and some of them to butchers at that! Any of you who are fortunate enough to have good calves at present will do well to take extra care of them, and you will be well repaid for your trouble.

REPORT OF SECRETARY-TREASURER.

This has been quite an uneventful year as regards this fine breed of cattle. Low prices are still the order of the day, consequently sales have been low. We may safely expect an improvement in prices in the near future.

Registrations.

We have recorded 150 animals of this breed between December 1st, 1895, and the corresponding date for 1896. We have on hand now 533 pedigrees for the 1st volume, and I am sorry to say 1,114 pedigrees lost by the fire have not been sent in to be copied they still come in by degrees. All Canadians should record in their own book.

Memberships.

Only fourteen members as yet have paid the second call, but we hope they will send in their fees in the near future, as the Association without funds sufficient to print the First Volume will not be able to do much good. As you are aware, all the funds for registration and members go into a common fund.

List of Members.

Members of the Hereford Breeders' Association from inception at $3 per year:

Hon. M. H. Cochrane, Hillhurst, Que.; Jas. Cochrane, Hillhurst, Que.; W. M. Vernon, Waterville, Que.; Jos. Cairns, Camlachie; Geo. Brent, Warwick West; Sir Donald A. Smith, St. James, Man.; Thos. Cannon, Aurora; F. A. Fleming, Weston; A. Waldie, Acton West; M. M. Boyd, Bobcaygeon; D. Jackson, Durham; J. R. Martin, Cayuga; H. Reed, Mimosa.

Second assessment, paid since December, 1895, at $2 per year: H. D. Smith, Compton, Que.; Alf. Stone, Guelph; A. Rawlings, Forest; Wm. Elliott, Porter's Hill; A. L. Howard, Bond Head John Srigley, Allandale; W. H. Hunter, Orangeville; W. H. Black, Amherst, N.S.; Jas. Carswell, Renfrew; I. P. Wiser, Prescott; Jos. Sharman, Toddburn, Man.; Wm. McClaughry, Souris, Man.; R. Stutt, Forest; Wm. Sharman, Souris, Man.

At the Fat Stock Show a year ago at Guelph only seven of this breed were entered, but they were of good quality; the exhibitors were the estate of F. W. Stone, Guelph, and our worthy President, Mr. H. D. Smith, of Compton, Que.

At the Industrial Exhibition held in Toronto last September there were four exhibitors of good herds, forty-six animals being shown. Prizes were as follows:

Bull three years old and upwards: 1st, Fleming & Co., Weston, "Young Pinkham"; 2nd. D. M. Wilson, Moe's River, Que., "Earl Douglas 59163."

Bull two years old: 1st, H. D. Smith, Compton, Que., "Amos of Ingleside 58488"; 2nd, Alfred Stone, Guelph, "Gracchus 63839."

Bull one year old: 1st, Alfred Stone, Guelph, not named; 2nd, H. D. Smith, Compton, Que., "Sir Horace 63868."

Bull calf under one year: 1st, D. M. Wilson, Moe's River, Que., Mount Royal; 2nd, Alfred Stone, Guelph, "Silver Creek"; 3rd, H. D. Smith, Compton, Que., "Amos 3rd of Ingleside."

Cow four years old and upwards: 1st, H. D. Smith, Compton, Que., "Lady Tuckingham 3rd 44679"; 2nd, H. D. Smith, Compton, Que, "Spot 3rd 48222"; 3rd, Alfred Stone, Guelph, "Cherry 25th 35258."

Cow three years old: 1st, Fleming & Co., Weston, Lady Fern 7th; 2nd, Alfred Stone, Guelph, Sweetheart 28th 63848"; 3rd, H. D. Smith, Compton, Que., "Lydia of Ingleside 58492."

Heifer two years old: 1st, H. D. Smith, Compton, Que., "Sylvan 3rd of Ingleside 58495"; 2nd, D. M. Wilson, Moe's River, Que., "Lady Goldie 59164"; 3rd, Alfred Stone, Guelph, "Cherry 47th 63837."

Heifer one year old: 1st, H. D. Smith, Compton, Que., "Jessie of Ingleside 63622"; 2nd, D. M. Wilson, Moe's River, Que., Ruth; 3rd, H. D. Smith, Compton, Que., "Princess Bonnie 61799."

Heifer calf under one year: 1st, Fleming & Co., Weston, Ont., no name; 2nd, Alfred Stone, Guelph, no name; 3rd, H. D. Smith, Compton, Que., "Daisy of Ingleside.',

Female of any age, silver medal: H. D. Smith, Compton, Que., "Lady Tushingham 3rd 44679."

Herd, one bull and four females over one year, owned by exhibitor: 1st and 2nd, H. D. Smith, Compton, Que.; 3rd, Fleming & Co., Weston, Ont.

FINANCIAL STATEMENT.

1895, December 1st.	To cash on hand	$78 00
1896, January 1st.	12 paid members	24 00
" "	Cash registration fees	98 25
		$200 25
	Cr.	
1896, December 1st.	By commission on pedigree	$44 26
" "	Stationery and printing	5 80
" "	Postage	2 97
" "	Cash on hand	147 22
		$200 25

(Signed) H. WADE,
Sec.-Treas.

A FIELD FOR THE HEREFORD.

BY G. DEWARREN GREEN, TORONTO.

The low prices that have prevailed for some time past for beef cattle have had a depressing effect on all pure-bred beef breeds, Herefords included, owing to the lessened demand for sires to head herds. These times of depression seem to come periodically, a period of depression being invariably followed by one of good prices, and *vice versa*. It will thus be in order to expect an improvement in prices in the near future. In the meantime, breeders and feeders of beef cattle must concentrate their efforts on keeping down the cost of production and feeding expenses in every way. Let us see how this can be done as regards Herefords.

Herefords and Hereford grades and crosses are admitted by all who know anything about them, to possess the characteristic of being particularly good grazers. They are also good mothers, and, although like other breeds, they respond quicker to good feeding, yet they do very well on ordinary pasture. The county of Hereford, where the breed originated, is generally supposed to be a land of rich pastures, but, if we except the meadows alongside of the rivers, the soil of the rest of the county is not first-class in character, and yet there they do exceedingly well. Cannot these grazing qualities of theirs be turned to better account than they have been, in the production of beef for the British markets? I think they can. In the August number of the *Canadian Live Stock Journal* of last year, there was an account of the success that Messrs. Weir, of St. Marys, Ont., had attained in feeding steers on pasture for the British markets. At first, they had practised stall feeding, but they soon found that they could make so much more off grass feeding than off stall feeding that they abandoned the latter process. The steers, which were Shorthorn grades, were purchased in April, having been partially fed in the stalls, and were all sold off by July. Even with the low prices for beef prevailing, the profits per acre were exceedingly good.

Is there not here a field for the breeder or feeder who handles Herefords? I should say that there certainly is. In my own experience with them, I found that on pasture even the breeding cows would keep fat, though suckling calves, while as regards dry cows, the trouble was too keep them from getting too fat. We constantly hear complaints from shippers of cattle that they cannot obtain a sufficient number of good fat cattle to export to Great Britain during the summer and fall months, and, consequently, have to ship inferior stock. Would it not be well for a number of farmers to co-operate and purchase a Hereford sire or sires to cross on their grade cows for the purpose of raising young stock for feeding for the British market on pasture? I certainly think it would be a wise move, and it is certain that a shipment of prime Hereford grades would meet with a ready sale on their arrival on the other side.

FIFTH ANNUAL REPORT

OF THE

HACKNEY HORSE SOCIETY.

The fifth annual meeting of the Hackney Horse Society was held in the Albion Hotel, Toronto, on February the 4th, 1897, at 8 p.m.

The following members were present: Robt. Beith, M.P., Bowmanville, President; A. Wilson, Paris Station; Robt. Graham, Claremont; John Holderness, Toronto; Robt. Davies, Toronto; D. Sorby, Guelph; W. Weld, London; S. J. Spencer, London; H. N. Crossley, Toronto; John Macdonald, Toronto; Geo. Pepper, Toronto; R. Bond, Toronto; Dr. Smith, Toronto; Major McEwen, Byron, and H. Wade, Secretary.

PRESIDENT'S ADDRESS.

By R. Beith, M. P., Bowmanville.

It is now six years ago since we met to organize the Hackney Horse Society. At that time this breed of horse was little known on this continent, but since then it has become one of the most popular breeds of horses we have in this country. It is a demonstrated fact they are well bred, and transmit to their offspring qualities of action and conformation more than any other horse I know of. Wherever you can get a horse of the Hackney conformation or Hackney action, the dealer says he is like a Hackney, so that is ample proof they are a popular class of horse in our country. And not only are they popular, but I think, in future they will be one of the most valuable harness horses that we will have in this Dominion, not only on account of their superior action and conformation, but on account of their endurance. I think that has been demonstrated. Until recently we have had no chance to demonstrate that, but now we have young Hackney horses in the country which are being used for harness purposes, and I have heard several admit we have had no horses in this country their equal. Of course, the horse business has been in a very depressed state, and they were introduced into this country in a time when things were in a backward condition, and we have not had a chance to realize for the outlay, but we hope that there is a better time coming, that we have turned the dark corner, and that we are going to realize for the outlay we have made in this class.

Moved by Mr. Crossley, seconded by Mr. D. Sorby, that the minutes be taken as read. Carried.

Mr. Wade then read his annual report, and it was moved by H. N. Crossley seconded by John Macdonald, that it be adopted. Carried.

REPORT OF THE SECRETARY.

TORONTO, February 4th, 1897.

I hereby present to you the fifth Annual Report of this Society, showing the transactions for the year ending Dec. 31st, 1896.

It is with great regret that I have to chronicle, since our last meeting, the death of one of our prominent officers, Mr. George H. Hastings, of Deer Park. He was a very active member of this Society, and had done much for the Hackney cause, both practically and by his writings. He will be much missed by us at our meetings.

REGISTRATIONS.

We have recorded 33 Hackneys this year, one-third of them being sent in by the Rawlinson Bros., of Calgary; one of the firm, Mr. A. M. Rawlinson, being our vice-pres. for Alberta. This is very satisfactory.

MEMBERS.

Fourteen gentlemen have paid their fees for this year; there is room for more.

EXHIBITIONS.

The prizes awarded at the Canadian Horse Show for 1896 were reported at our last annual meeting in May last.

At the Industrial held in September last, under the judgment of F. S. Peers. Mount Morris, N.Y., and John T. Gibson, Denfield, the following awards were made:

Section 1. Hackney Stallion and four of his progeny, the progeny not to be over two years old. 1st was awarded to H. N. Crossley, Rosseau, for Fireworks (imp.)—16—(3602), and his stock.

Section 2. Stallion four years old and over. First to Graham Bros., Claremont; for Royal Standard (imp.)—55—; 2nd to R. Beath & Co., Bowmanville; for Banquo—3—and 3rd to H. N. Crossley, Rosseau, for Fireworks (imp.)—16—(3602).

Section 3. Stallions three years of age. 1st to Hillhurst Farm, Hillhurst, Que., for Barthope Performer, (imp.)—52—(5097); 2nd to H. N. Crossley, Rosseau, for Rosseau Performer, (imp.)—34—(5391).

Section 4. Stallion two years old. 1st to H. N. Crossley for Rosseau Fireball —39—; 2nd to Hillhurst Farm for Danish Duke —53—.

Section 5. Yearling Colt. 1st to Hillhurst Farm for Hillhurst Sensation, —58—; 2nd to George H. Hastings, of Deer Park, for Alahambra —56—.

Section 6. Sweepstakes. Graham Bros. for Royal Standard (imp.)—55—(3918).

Section 7. Filly three years old. 1st to George H. Hastings, Deer Park, for Fanny Bardolph —38— 2nd to Hillhurst Farm for Matchless Maid —24—.

Section 8. Filly two years old. 1st to R. Beith & Co., for Jessica —25—; 2nd to Graham Bros. for Rose —52—; 3rd to George H. Hastings for Princess Denmark —39—.

Section 9. Yearling filly. 1st to H. N. Crossley, for Rosseau Victoria —46—; 2nd to same for Rosseau Birdie (47); 3rd to Hillhurst Farm for Lady Shales —53—.

Section 10. Brood mare with foal of same bred by her side. 1st to Hillhurst Farm for Princess Dagmar (imp.)—10—(4590); 2nd to H. N. Crossley for Lady Bird (imp.)—15—(5510); 3rd to R. Beith & Co. for Lady Aberdeen (imp.)—5—(5482).

Section 11. Foal of 1896. 1st R. Beith & Co., for Lorenzo —57—; 2nd to Hillhurst Farm, for Lady Dagmar —54—; 3rd to H. N. Crossley for Rosseau Firebrand —59—.

Section 12. Single horse, mare or gelding, not more than 15¾ hands. 1st to H. N. Crossley for Althorpe Duchess (imp.)—21—(6358); 2nd to R. Beath & Co. Mona's Queen (imp.)—4—(5887); 3rd to Hillhurst Farm for Charwoman (imp.)—9—(5887).

Section 13. Best mare, any age. 1st Hillhurst Farm, for Princess Dagmar (imp.)—10—(4590).

Section 14. Best Hackney Stallion, given by Hackney Horse Society of Great Britain. Awarded to Graham Bros. for Royal Standard (imp.)—55—(3918).

Section 15. Best Hackney or Pony mare; filly foal. Awarded to Hillhurst Farm for Lady Shales —53—.

The Secretary of the English Hackney Horse Society has written again offering medals at our principal shows for 1897, and they can be awarded to Canadian bred Hackneys if their sire and dam are recorded in the British Book as well as to imported horses.

STUD BOOK.

We have now on record 67 stallions and 85 females or 152 horses altogether; these, with a few notes on Hackney subjects, would make a nice little volume. If funds can be provided, it would be well to publish it before long.

(Sgd.) H. WADE,
Secretary.

FINANCIAL STATEMENT.

I beg leave, as Treasurer, to submit the following statement for 1896:

RECEIPTS.

1896.	
Jan 1st. Cash on hand	$101 00
Dec. 31st. 14 members at $5	70 00
33 registrations	63 00
	$234 00

EXPENDITURES.

1897.	
Dec. 31. By prizes awarded at Shows	$ 85 00
Com. paid on 33 pedigrees at 35c	11 55
Postage	3 35
Stationery	2 00
Cash on hand	132 10
	$234 00

(Sgd.) H. WADE,
Treasurer.

ELECTION OF OFFICERS.

The election of officers resulted as follows:

President: R. BEITH, Bowmanville.

1st Vice-President: H. N. CROSSLEY, Toronto.

2nd Vice-President: JOHN MACDONALD, Toronto.

Vice-Presidents for the Provinces: Ontario, A. G. RAMSAY, Hamilton, Ontario; Quebec, J. A. COCHRANE, Hillhurst, Quebec; Nova Scotia, Mr. BLACK, Nova Scotia; New Brunswick, HON. D. MCLELLAND, St. Johns, N.B.; Prince Edward Island, HON. JAMES CLOWE, Murray Harbor; North-West Territories, Mr. RAWLINSON, Calgary, Alta., Manitoba, A. J. MOORE, Swan Lake, Manitoba; British Columbia, S. F. TOLMIE, Victoria, B.C.

Directors: R. DAVIS, Toronto; R. GRAHAM, Claremont; R. MILLER, Brougham; DR. SMITH, Toronto; O. SORBY, Guelph; R. BOND, Toronto; MAJOR R. MCEWEN, Byron JOHN HOLDERNESS, Toronto; GEO. PEPPER, Toronto.

Delegate to Industrial Exhibition: HENRY WADE, Toronto.

Delegates to Western Fair: ADAM BECK, London; A. G. BOWKER, Woodstock.

Delegate to Ottawa: ROBT. BEITH, M.P., Bowmanville.

Delegate to Montreal: JAS. A. COCHRANE, Hillhurst, Que.

Delegate to Woodbridge: JOHN MACDONALD, Toronto; JOHN HOLDERNESS, Toronto.

Delegates to the Horse Breeders' Association: ROBT. BEITH, M.P., Bowmanville; JOHN MACDONALD, Toronto.

Auditor: C. F. COMPLIN, London.

Judge at the Spring Horse Show: Richard Gibson, Delaware.

Judges Recommended for Industrial: Richard Gibson, Delaware; R. Rumsdale, A. B. McLaren, Aurora, Ill., U.S.; Henry Fairfax, Aldie, Loudoun Co, Va., U.S; R. P. Sterricker, Springfield, Ill.; H. K. Bloodgood, New Marlboro, Mass. U.S.; A. J. Cassatt, (Chesterbrook Farm), Berwyn, Pa., U.S.

Judges Recommended for Ottawa: R. Beith, M.P., Bowmanville.

Judge Recommended for Montreal: John Holderness, Toronto.

Mr. Davies: I think it would be only the duty of this Association to form a committee to have the President and our Secretary draw up a memorial on behalf of our late esteemed friend, Mr. Geo. H. Hastings. He has contributed much money and a great deal of time to further the interests of the Hackney horse, and I think it would be only our duty to have a memorial drawn up and forwarded to his widow. I would move that this be done. Seconded by A. Wilson, and carried unanimously.

HACKNEY HINTS.

The following was contained in a communication from Mr. J. A. Cochrane, of Hillhurst Station, Que.:

I am sorry to say that I shall be unable to attend the Hackney meeting, although I should much like to bring up some matters at that gathering. I refer to amendments to rules of entry which I have suggested to the American Hackney Society, and have been appointed with Mr. H. Fairfax a committee to report on at the special meeting to be held February 2nd. I enclose draft of amendments which Mr. Fairfax has expressed his approval of, therefore I feel that they are reasonably certain to be adopted, the object being to retain the produce of all stock now registered, and to get as many good foundation mares as possible into the book.

In Canada we have a better class of mares in farmer's hands, more thoroughbred blood, a better organized system of inspection and superior natural advantages of soil and climate besides the high reputation of Canadian bred horses in foreign markets, therefore, I think the opportunity is at hand for the Hackney Society to make a special effort to get all the good mares within reach of Hackney stallions, registered as foundation stock with as little expense as possible, and thus lead to the systematic breeding up of the finest harness and saddle horses on the continent. If the meeting should not be disposed to take up the matter of amendments to rules of registration, would it not be well to appoint a committee to report at the time of the Horse Show?

Proposed Amendments.

Qualifications for Registry.

(6) A mare by a thoroughbred stallion and out of a "full registered dam" shall be eligible for "half registry."

(7) A mare by a standard bred stallion and out of a "full registered" dam shall be eligible for "half registry," provided that in all the foregoing conditions no mare having two successive crosses of other than Hackney stallions shall be eligible for registry.

It was moved by A Wilson, seconded by Dr. Smith, that Messrs. Crossley, Beith and Wade, along with Mr. Cochrane, meet at the time of the spring show and take up Mr. Cochrane's proposed amendments. Carried.

THE HACKNEY HORSE SOCIETY OF GREAT BRITAIN.

The following letter was then read :

LONDON, ENG., January 1st, 1897.

DEAR SIR,—I have pleasure in sending under separate cover some copies of this society's offer of silver medals to Canadian shows. I shall be exceedingly obliged if you will send them to the secretaries of some of the Canadian shows, as we are desirous of having the scheme adopted by as many societies as possible. You will note that there are no restrictions as to the offer of the medal, and we give the shows making application the choice whether it shall be offered to an imported horse or to the produce of an imported horse.

Trusting that you will give your kind assistance in this matter,

I am, dear sir,

Yours truly,

(Signed), HENRY F. EUREN.

H. WADE, Esq.

OFFER OF SILVER MEDALS TO FOREIGN SOCIETIES.

SIR,—I have to inform you that the Council of this Society has adopted the following scheme for the offer of silver medals to affiliated societies :

(*a*) For the best Hackney mare or filly registered in the English Hackney Stud Book or entered for the subsequent volume ;

Or the following alternative scheme :

(*b*) For the best Hackney mare or filly by an imported sire and out of an imported dam, both registered in the English Hackney Stud Book.

The society applying for the medal may select the scheme (either *a* or *b*) under which the competition shall be held. Application cannot be made for both schemes.

Where not less than £25 ($125) are offered in classes for Hackney stallions, or entire colts, the council will give a second silver medal.

(*c*) For the best Hackney stallion or entire colt, registered in the English Hackney Stud Book or entered for the subsequent volume ;

Or the following alternative scheme :

(*d*) For the best Hackney stallion or entire colt, by an imported sire and out of an imported dam, both registered in the English Hackney Stud Book.

The society applying for the medal may select the scheme (either *c* or *d*) under which the competition shall be held. Application cannot be made for both schemes.

No animal can take more than one medal during any one year.

In the event of any dispute as to the interpretation of these rules the Council of the Hackney Horse Society reserves full power of decision.

Should your society decide to co-operate in the foregoing scheme, it is desired that application be made on the form attached.

HENRY F. EUREN,
Secretary.

NOTE.—Affiliated societies pay an annual subscription of one guinea, and receive a silver medal or medals, a free copy of the stud book annually (for the use of members and for preparation of catalogue), and all printed matter relating to the society's work, as published. A reserve to the winner of the medal should be selected in every case.

Moved by ROBERT DAVIES, seconded by A. WILSON, that the medals given by the English Hackney Society be given as a sweepstakes prize for the best Canadian bred mare out of imported stock, also the best Canadian bred horse out of imported stock at the Spring Horse Show. Carried.

Moved by O. SORBY, seconded by ROBERT GRAHAM, that the secretary be instructed to write a letter to the Industrial Association recommending that imported stallions (Hackneys) get those medals at the Industrial Exhibition. Carried.

Mr. WADE then read a temporary prize list as drawn up by him and Mr. Houston for the Spring Horse Show, and the following amendments were made:

Moved by GEORGE PEPPER, seconded by A. WILSON, that a prize be given for a Hackney stallion and three of his get, foaled subsequent to January 1st, 1894, and not necessarily registered. Carried.

Moved by GEORGE PEPPER, seconded by ROBERT DAVIES, that a sweepstakes prize of $50 be given at the Spring Horse Show—$25 for mares and $25 for stallions. Carried.

Moved by Dr. SMITH, seconded by O. SORBY, that $25 be given as sweepstakes for Hackney stallions and $25 as sweepstakes for Hackney mares at the Industrial Exhibition. Carried.

LESSONS FROM THE SHOWS.

By RICHARD GIBSON, DELAWARE.

I do not intend taking up time in writing the history of the Hackney, or asking you to listen to the tracing of its descent down to the very pair that sailed on the Ark—sufficed for our purpose that we have the Hackney with us.

What I wish to do is to offer a few suggestions, with the expectation that they may cause a discussion, and establish facts that will be of value not only to the individual but to the breeders at large.

One thing is very evident, and that is size is demanded in the United States. This has been emphasized very strongly by the action of a western stock breeders' paper in reporting the late Horse Show, Madison Square Gardens, New York, especially that part of it referring to the awards in the senior stallions' championship, and following up to that report with a still stronger letter of condemnation of the award. In this letter ground is taken that I don't think the Hackney breeders can endorse, viz: That the Hackney is a carriage horse, and must be at least sixteen hands high. I join issue at once, and maintain the Hackney is something besides a carriage horse, and that sixteen hands and upwards is too high. When the American breeders assume the same position as the reporter, and ask for sixteen-hand Hackneys I should just like to see one class shown. I venture to say there would be some rum lookers amongst the lot. And here I want to caution the breeders not to cater to any want that will end in injuring and destroying the type that has taken generations to produce. I can remember when there was the same insane idea for big Shropshire sheep, and had not a few breeders stuck to the type, and judges been selected to follow that type, we would now be struggling with a long-legged, raw-backed "no account" sheep. Let me here beg of you not to sacrifice the best qualities of your breed to get abnormal size. Bear in mind that the monstrosities of all animal life are freaks, and ought to be so regarded. Nature adapts the animal structure according to its requirements.

Sheep that have enjoyed the indolent life and luxurious living of the Cotswold and Lincoln for generations have become of monstrous size, while those found on the mountains of Scotland and Wales are light of frame and active of foot, able to climb the steep mountain sides and fill and enjoy themselves where their more sluggish cousins would perish.

Another lesson learned was, that action was not everything, there must be in addition quality and conformation. By the former I don't mean pretty, but a certain high bred appearance with good heads and necks, hard, flinty, flat legs, and clean, well defined hocks.

By conformation, I mean an even balanced whole. Especial care must be taken as regards shoulders. Too many have loaded, gross shoulders, and too few with them well laid and sloping.

Again I would impress upon you the necessity of showing in harness if you wish to retain the popularity the breed has acquired. At the large shows no breed commands the same enthusiasm or interest as does the Hackney. If this is to be maintained they must show themselves as workmen between the shafts as well as dudes at the end of a white lead.

At the late Madison Square Garden show your Canadian exhibitors did themselves credit. In the three-year-old class Senator Cochrane's Barthope Performer won easily. He is a most improved and improving colt. Never have I seen a horse "come on" so fast as since the fall shows, growing, but still retaining all the quality for which he was noted. His action was sensational, high, and true all round. He went with such vim and determination that he fairly carried away the knowing ones around the ring. Had he gone as well when showing for the junior championship, for which he was reserved, there might be another tale told.

In this class H. N. Crossley won third with Rosseau Performer, a horse of nice quality and good shape, but did not move quite well enough to get second.

In aged Hackney mares the celebrated Kathleen was awarded first, very closely followed by Senator Cochrane's Princess Dagmar. Canny Maid, formerly owned by Mr. Beith, was fourth. Princess Dagmar went better than any others in the class, but was not in bloom, while Kathleen was badly handicapped, carrying a forward foal.

In the futurity stakes, H. N. Crossley came in fourth and sixth with a pair quite promising but not developed to the extent of their American cousins; the world is before them however, and time only is required. In one year old stallions Mr. Cochrane again captured third, this was a strong class.

In conclusion, the future of the Hackney depends upon the success with which they cross upon our native mares. Wisdom must be exercised in the selection of mares; not every half-bred colt will be a winner, and not too much must be expected. Mares must be large and of good quality; those containing some thoroughbred blood in their pedigree, if large enough shoul I should nick well. Size in the stallion I should not care so much about, but on our cold-blooded ordinary stock of the country mares the stallion must have lots of quality, and care must be taken by every breeder and importer to go to those families that are producing the winners. In Hackneys as well as other stock the prize winning strains are good strains to stock to.

Moved by Mr. Wade, seconded by Mr. A. Wilson, that a vote of thanks be tendered Mr. Gibson for the admirable paper which has just been read. Carried.

HACKNEYS AT THE TORONTO INDUSTRIAL EXHIBITION.

Premiums won by the Hackneys at the Industrial Exhibition, Toronto, August 31st to September 12th, 1896.

HACKNEY STALLION AND FOUR OF HIS PROGENY, THE PROGENY NOT TO BE OVER TWO YEARS OLD.

1st. Fireworks (imp.)—16—(3602); brown, foaled in 1890. Bred by James Scott, Pocklington, Yorkshire, England; imported in 1893; sire, Wildfire (1224); dam, Pretty Polly (4574); exhibitor, H. N. Crossley, osseau.

STALLION FOUR YEARS OLD AND UPWARDS.

1st. Royal Standard (imp.)—55—(3918); bay, white hind feet, 15.2½, foaled in 1890. Bred by B. H. Lane, Limavady, Ireland; imported in 1895 by exhibitors; sire, Excelsior (198); dam, Royal Lady (imp.) (379). Exhibitors Graham Bros., Claremont.

2nd. Banquo—3—; dark bay, star on face, four white feet; foaled in 1892. Bred by exhibitors; sire, Jubilee Chief (imp.)—1—(2122); dam, Mona's Queen (imp.)—4—(5887). Exhibitor, R. Beith & Co., Bowmanville.

3rd. Firework (imp.)—16—(3602). Exhibitor, H. N. Crossley, Rosseau.

STALLION, THREE YEARS OLD.

1st. Barthope Performer (imp.)—52—(5097); dark chestnut, with star, foaled in 1893. Bred by Thomas Jennings, Yorkshire, Eng.; imported by exhibitor; sire, Duke of Connaught (3009); dam, Princess (3209). Exhibitors, Hillhurst Farm, Hillhurst, Que.

2nd. Rosseau Performer (imp.)—34—; chestnut roan, foaled in 1893. Bred by John T. Browne Doncaster, Yorkshire, Eng.; imported in 1894; sire, Enthorpe Performer (2973); dam, Fanny (111). Exhibitor, H. N. Crossley, Rosseau, Ont.

STALLION TWO YEARS OLD.

1st. Rosseau Fireball—59—; brown, star on nose, hind feet and near fore foot white, foaled April, 1894. Bred by exhibitor; sire, Fireworks (imp.)—16—(3602); dam, Lady Cocking (imp.)—11—(5580). Exhibitor, H. N. Crossley, Rosseau.

2nd. Danish Duke—53—; bay, snip on nose, hind ankles white, foaled in 1894. Bred by exhibitor; sire, Fordham (imp.)—36—(287); dam, Princess Dagmar (4595). Exhibitor, the Hillhurst Farm, Hillhurst, Que.

YEARLING COLT, ENTIRE.

1st. Hillhurst Sensation—58— bay, little white on off hindheel,—foaled in 1895. Bred by exhibitor; sire Hayton Shales (imp.)—22—(4806); dam, Miss Baker (imp.)—16—(4371), by Ruby (1342). Exhibitor Hillhurst Farm, Hillhurst, Que.

2 d. Alhambra—56—; black brown, white mark on hind foot, foaled May 12th, 1895. Bred by exhibitor; sire, Black Nobleman—18—; dam, Soubrette (imp)—13. Exhibitor, Geo. H. Hastings, Deer Park.

STALLION, ANY AGE.

1st. Royal Standard (imp.)—55—(3918). Exhibitors, Graham Bros., Claremont.

FILLY, THREE YEARS OLD.

1st Fanny Bardolph—38—; chestnut, white blaze on face, white feet, foaled July, 1893. Bred by exhibitor; sire, Lord Bardolph (imp.)—32—(412); dam, Norfolk Duchess (imp.)—12—(2255). Exhibitor, Geo. H. Hastings, Deer Park.

2nd, Matchless Maid—24—; bay, foaled in 1893. Bred by exhibitor; sire, Fordham (imp.)—36—(287); dam, Nancy (imp.)—26—(4460), by Matchless of Londesboro (1517). Exhibitor, the Hillhurst Farm, Hillhurst, Que.

THE CLYDESDALE HORSE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The eleventh annual meeting convened in the Albion Hotel, Toronto, on Thursday the 4th of February, 1897, at 2 p.m.

The following members were present: R. Davies, President, Toronto; D. Sorby, Guelph; Jas. I. Davidson, Balsam; J. B. Spencer, London; Robt. Miller, Brougham; Robt. Beith, M.P., Bowmanville; Robt. Graham, Claremont; Jas. M. Gardhouse, Highfield; John Vipond, Brooklin; Geo. Clayton, Peepabun; Geo. Cockburn, Baltimore; Wm. Weld, London; N. H. Crossley, Toronto; O. Sorby, Guelph; A. Wilson, Paris; A. Doherty, Ellesmere; and H. Wade, Secretary.

Moved by Robt. Miller, seconded by Robt. Graham, that the minutes be taken as read, and that the Secretary's report be adopted. Carried.

PRESIDENT'S ADDRESS.

By R. Davies, Toronto.

I have much pleasure in again welcoming you to the annual meeting of the Canadian Clydesdale Horse Association, and while everything is not as rosy as we could wish, yet we may be permitted to hope that we are approaching better times with more hopeful business prospects for the Association and ourselves individually.

In the Secretary's report for the past year's business of our Association you will notice that the number of transfers and registrations is increasing, and I would point out that as a result of a conference held between the Hon. Mr. Fisher, Minister of Agriculture for the Dominion, and the Hon. Mr. Dryden, Minister of Agriculture for this Province, and the authorities at Washington, with some assistance by various associations in sympathy, no doubt we will be able to come to terms whereby our certificates will be recognized on equal terms with their own registrations.

Some years ago Canada found a very large market in the United States for Clydesdales, and through the enterprise of some of the large breeders there, who had purchased in the Old Country some of the best stock that could be had, they are now finding a ready market both in Canada and England for their stock, with which they have competed and taken some of the highest honors at the Old Country shows.

In my reports for the past two years I have mentioned that we should still continue to breed only the best class of Clydesdales, as we would then find a ready market at good prices. You are aware that dray horses have increased in price at least 50 per cent. over the prices that have been ruling for some time past. Our Province, just now, has many foreign buyers who are anxious to purchase horses from 1,600 to 1,800 lbs. weight, and the reports I hear are that it is almost impossible to get sufficient of that kind of horse to meet the demand. Further, our breeders having sold a lot of their best brood mares, and because of the lack of breeding in consequence thereof for the past few years, the Clydesdale horse is bound to become still more valuable.

Your attention is directed to the fact that a large and increasing trade of horses from this Province is being done with the old country. The regret is that much of the

trade has been shipped from American ports, instead of from Canadian ports. Having this knowledge it was thought desirable that an effort should be made to secure this trade, and for that purpose last week Mr. John Sheridan and myself waited upon the Deputy Minister of Marine at Ottawa and asked him that better accommodation and more comfortable stalls be given to shippers for their stock, and we are assured that the necessary Order-in-Council embodying the carrying out of these desired improvements will be passed as soon as possible. Mr. Sheridan, who is one of the largest shippers of horses in Canada, gives the following as an instance of the difference made in the value of horses by the condition in which they are landed in the old country: In one shipment made under these desired regulations the horses arrived in splendid condition and brought the highest price ever paid in London market for Canadian horses, netting fully £7 per head more than they would have brought had they been shipped from our own ports under the old state of affairs.

The display of Clydesdales at last spring's show was one of which anybody who is interested should be proud, both in regard to numbers and quality. The Horse Breeders' Association and the Country and Hunt Club are making arrangements for a horse show this spring, and I have no doubt that a satisfactory agreement will be arrived at.

ANNUAL REPORT OF THE SECRETARY FOR 1896.

I beg leave to present to you the eleventh report of this Association, giving a synopsis of the business transacted during the last year.

Registrations.

We have recorded 100 Clydesdales and have made 15 transfers, against in 1895, 76 registrations; the fees amount to $130. This is gratifying, and I am very confident that we will record many more this year, as there is a great possibility that our certificates will be again recognized in crossing the lines. They will be if the Clydesdale Association of the United States does no object; and they should not, as all animals going over there will ultimately be recorded in their Book. This is the result of a conference held between the two Ministers of Agriculture, the Hon. Mr. Fisher and the Hon. John Dryden, with the Secretary of Agriculture and his deputy at Washington a short time ago.

Members.

Forty members have paid their annual dues for 1896, against 66 who paid in 1895. This is quite a falling off, and is the result of trying to amalgamate with the American Association. I am strongly of the opinion that we will get more members this year.

Spring Stallion Show.

This was again held in conjunction with the Canadian Horse Show, and the display of these fine animals was an honor to the Province. $100 was donated as a sweepstake prize for a pair of draught mares or geldings shown in harness, to be sired by a registered Clydesdale stallion; this brought out six fine teams that were a credit to the Province. We also gave $20 to the Western Fair at London for the best stallion exhibited. In aged stallions there were twelve entries; they were judged by R. Ness, Esq., Howick, Que. The first prize was awarded to the Graham Bros., of Claremont, for the "Royal Standard" (imp.) [2221] (10014). The second, Robert Davis, Toronto, "Prince of Quality" [2173] 5648. The third was awarded to C. E. Clark, of St. Cloud, for "Erskine McGregor" (imp.) [2225] 7543. The fourth, John Davidson, Ashburn, for "Lewie" [2177] 7294, bred by the exhibitor. The fifth, to T. W. Evans, Yelverton, for "Craichmore Darnley" (imp.) [2127] (5667). The sixth, or highly commended, to John Vipond, Brooklin, for "Erskine Style" [2121] bred by himself, and commended to C. E. Clarke,

St. Louis, for "Ingram's Heir" [2224], bred by themselves; second to C. E. Clarke, St. Cloud, for "Stanley" [2227] bred by N. P. Clarke, and third to John Vipond, Brooklin, for "Whitby Champion [2175] bred by himself.

For stallions foaled subsequent and on Jan. 1st, 1894, the first went to Robt. Davis, Toronto, for "King's Own" [2172] bred by himself; the second to Graham Bros. for "Sensation" (imp.) Third to C. E. Clarke, St Cloud, for "Glen Alpine" [2228], bred by N. P. Clarke; fourth to Alex Doherty, Ellesmere, for "Macqueen" [2218] bred by himself.

For Canadian bred stallions foaled previous to Jan. 1st, 1893, the first was awarded to Job White, of Ashburn, for "Ashburn Hero" [2093], bred by the exhibitor; second to Jos. Alsop, Glasgow, for "Captain Willie" [2170]; 3rd to Alex. Holmes, Beachville, for "King Craft" bred by himself.

For stallions foaled in 1893. W. J. Howard, of Dollar, was awarded first for "City Boy" [2174] bred by himself. No other entries.

The Gold Medal for best stallion of any age was won by "The Royal Standard" (imp.) [2221] (10014), owned by the Graham Bros.

For Clydesdale mares, any age, the first was awarded to Robt. Davies for "Nelly" (imp.) [1323], second to same for "Pride of Thorncliff" (imp.) [1937]. The third to Graham Bros. for "Queen" [2263] bred by Wm. Carter, Pickering. The fourth to Jas. I. Davidson & Sons, Balsam, for "Boydston Lass 2nd" [2007] bred by themselves, and the fifth to Robert Davies for "Candour" (imp.) [1656].

For the draught team, the first was awarded to Geo. More, of Waterloo. The second to Wm. Hendrie, Toronto; 3rd to Robt. Davies, and the fourth to James I. Davidson & Sons, Balsam.

The Canadian Horse Breeders' Association has again asked for a grant for 1897, and no doubt the third Canadian Horse Show will be held in the Armouries as before, on the 22nd, 23rd and 24th of April. It behooves the members of this Association to make a better display than ever before, and if we can afford to give another special prize this year, it will be advisable.

Stud Book.

We have only 71 stallions and 82 mares as yet for the IX. Volume, but with the assistance of the members and other Clydesdale men, at the low prices now charged for registration, we should have enough entries this year to enable us to print a book in 1898.

H. Wade,
Secretary.

FINANCIAL STATEMENT.

Receipts.

1896.		
Jan. 1st.	Cash on Hand	$ 39 85
Dec. 31st	40 Members' fees	120 00
"	100 registrations and 13 transfers	130 00
		$289 85

Expenditures.

1896.			
Dec. 31st.	By commission on 100 reg. at 35c.	$ 35 00	
	13 transfers at 15c	1 95	
			$ 36 95
	Stenographer		5 00
	Postage and Stationery		20 23
	Insurance on Stud Books		15 00
	Special Premium Canadian Horse Show		100 00
	" " Western Fair		20 00
	Cash on hand		92 67
			$289 85

(Sgd.) H. Wade,
Treasurer.

ELECTION OF OFFICERS.

The following officers were elected for the ensuing year:

President: ROBERT DAVIES, Toronto.

First Vice-President: ROBERT GRAHAM, CLAREMONT.

Vice-President for Ontario: DOUGLAS SORBY, Guelph.

" " *Quebec*: ROBERT NESS, Howick.

" " *Nova Scotia*: COL. CLARK Blain.

" " *New Brunswick*: A. S. MURRAY, Fredericton.

" " *Prince Edward Island*: W. P. BALDERSON, North Wiltshire.

" " *Manitoba*: J. E. SMITH, Brandon.

" " *North-West Territories*: JOHN A. TURNER, Calgary; J. M. MCFARLANE, Saskatchewan.

Directors: ROBERT BEITH, M.P., Bowmanville; JOHN DAVIDSON, Ashburn; GEORGE COCKBURN, Baltimore; ROBERT MILLER, Brougham; JOHN VIPOND, Brooklin; GEORGE CLAYTON, Peepabun; ALEX. DOHERTY, Ellesmere.

Delegates to Toronto Industrial Exhibition: WILLIAM SMITH, Columbus; OSWALD SORBY, Guelph.

Western Fair: ROBERT GRAHAM, Brougham; W. CHARLTON, Duncrief.

Ottawa Exhibition: JOHN DAVIDSON, Ashburn.

Montreal Exhibition: R. NESS, Howick, Que.

Delegates to Horse Breeders' Association: R. MILLER, Brougham; ROBERT DAVIES, Toronto.

Judge Recommended for Canadian Horse Show: R. BEITH, M.P., Bowmanville.

Judges suggested for Exhibitions: WM. GRAHAM, St. Mary's; R. NESS, Howick, Que.; JOHN LEE, Highgate; ROBERT MILLER, Brougham.

Auditor: C. F. COMPLIN, London.

RESOLUTIONS.

A short discussion took place at this period of the meeting as to giving a prize at the Canadian Horse Show, and it was finally moved by ROBERT MILLER, seconded by D. SORBY, that we grant $100 towards the prize list of the Canadian Horse Show for a heavy draught team, sired by a Clydesdale stallion. Carried.

Moved by JOHN DAVIDSON, seconded by ROBERT GRAHAM, that a prize of $50 be given at the Canadian Horse Show for colts foaled on and after January 1st, 1896, to be divided as follows: First prize, $25; second, $15, and third, $10. Carried.

GENERAL BUSINESS.

Mr. WADE: The dates for the Canadian Horse Show have been fixed for April 29th and 30th and May 1st, and I would like to get the opinion of the gentlemen present to know if this is too late.

Mr. BEITH and Mr. CROSSLEY thought these dates would be quite agreeable to them, but the Messrs. D. & O. SORBY were of the opinion it was a little late in the season, but as the Boston show was the week previous they could not suggest much more satisfactory dates than those mentioned.

Mr. WADE then read a letter from G. S. Macdonald, of Montreal, on "Inquiry into railway transportation charges on farm products and live stock in less than carload lots," accompanied by a circular called "Railroad charges on farm products," and asked for suggestions on it.

It was suggested by the members present that a colt should be rated at 500 lbs. instead of 1,000 lbs. Two animals 3,500 instead of 4,000 lbs.; also that a stallion should be rated at 3,000 lbs.

Mr. R. DAVIES said the chief thing to be looked into was the sending of horses or stallions without an attendant.

Mr. MILLER thought they should not be required to send a man a short distance with an animal if they did not feel disposed.

Mr. DAVIES suggested that they should send a horse at the risk of the owner if the owner felt so disposed, but if he wished to send an attendant they should not charge for him.

The meeting adjourned at 4.45 p.m.

CLYDESDALES AT THE INDUSTRIAL EXHIBITION.

Following are the premiums won by Clydesdales at the Industrial Exhibition, Toronto, August 31st to September 12th, 1896:

STALLION AND FOUR OF HIS PROGENY, THE PROGENY NOT TO BE OVER TWO YEARS OLD.

1st. Grandeur, (imp.) [1724] (6814); brown spot on forehead, one hind foot white; foaled in 1887. Bred by W. Hunter, Strausaer, Scotland; imported by exhibitors; sire, Darnley, (222); dam, Trim of Garthland (4699). Exhibitors, D. & O. Sorby, Guelph.

2nd. Westfield Stamp, (imp.) [1819] (9467); light bay, strip on face, hind feet white; foaled in 1890. Bred by James Walt, Westfield, Scotland; imported by Davidson & Sorby, Ashburn; sire, Cairnbrogie Stamp (4274); dam, Luck (11146). Exhibitors, Y. & J. Little, Mono Road.

STALLION FOUR YEARS OLD AND UPWARDS.

1st. Grandeur, (imp.) [1724] (6814). Exhibitors, D. & O. Sorby, Guelph.

2nd. The Royal Standard (imp.) [2220] (10014); brown, white on face, hind legs white; foaled in May, 1892. Bred by W. Robertson, Elgin, Scotland; imported by exhibitors; sire, Royalist (6242; dam, Betrinda (10150). Exhibitors, Graham Bros., Claremont.

3rd. Westfield Stamp, (imp.) [1819] (9467). Exhibitors, Y. & J. Little, Mono Road.

4th. Golden Brown, (imp.) [362] (3658); brown, stripe on face, hind pasterns white; foaled in 1888. Bred by J. Noble, Edinburgh, Scotland; imported by P. Button, Ringwood; sire, Glenlyon (1671); dam Fancy (3938). Exhibitors, Graham Bros., Claremont.

STALLION THREE YEARS OLD.

1st. Locksley, [2182]; bay, stripe on face, white feet, foaled May, 1893. Bred by exhibitors; sire, Sir Walter (imp.) [1131] (8272; dam, Maria (imp.) [979]. Exhibitors, R. Beith & Co., Bowmanville.

STALLION TWO YEARS OLD.

1st. King's Own, [2172]; brown, off hind foot white; foaled May, 1894 Bred by exhibitor; sire, Queen's Own (imp.) [1708] (7176); dam, Candour (imp.) [1656]. Exhibitor, Robert Davies, Toronto.

2nd. Macqueen, (2218); dark bay, ratch on face, hind heels white; foaled May, 1894. Bred by exhibitor; sire, Queen's Own (imp.) [1708[(7176); dam, Miss Fleming (imp.) [1919]. Exhibitor, Alex. Doherty, Ellesmere.

3rd. Grandeur 2nd., [2246]; bay, white face, off hind foot white; foaled May 3rd, 1894. Bred by exhibitors; sire, Grandeur, (imp.) [1724] (6814); dam, Bell (imp.) [1758]. Exhibitor, I. Devitt & Sons, Freeman.

BROOD MARE WITH FOAL OF SAME BREED BY HER SIDE.

1st. Barr Bell, (imp.) [1524]; light bay, stripe on face, hind legs below fetlocks white; foaled May, 1888. Bred by R. Calander, Newton, Scotland; sire, Barney (4829); dam, Barr Jean (3314). Exhibitor, Robert Davies, Toronto.

2nd. Nelly, (imp.) [1323]; bay, stripe on face, near hind foot white; foaled May, 1888. Bred by D. Alston, Crosslee Stow, Scotland; sire, Lord Lyndock (4530); dam, Maggie of Hyndford (1). Exhibitor, Robert Davies, Toronto.

3rd. Boydston Lass, [1920]; bay, ratch on face, hind feet white; foaled June, 1882. Bred by M. W. Miller, Claremont; sire, Boydston Boy, (imp.) [216] (111); dam, Bell (imp.) [617] (510). Exhibitors, Jas. I. Davidson & Son, Balsam.

FOAL OF 1896.

1st. Princess Bell, [2281]; bay, hind ankles white; foaled March, 1896. Bred by exhibitor; sire, Prince of Quality [2173]; dam, Barr Bell (imp.) [1324]. Exhibitor, Robt. Davies, Toronto.

2nd. Princess Maude, [2282]; bay, blaze on face, black points; foaled April, 1896. Bred by exhibitor; sire, Prince of Quality [2173]; dam, Pride of Drummuir (imp.) [1325]. Exhibitor, Robt. Davis, Toronto.

3rd. Boydston Yet, [2247]; bay, small star on forehead; foaled March 8th, 1896. Bred by exhibitors; sire, Tofty (imp.) [2123] (9452); dam, Boydston Lass [1920] 2388. Exhibitors, Jas. I. Davidson & Son, Balsam.

MARE WITH TWO OF HER PROGENY.

1st. Candour, (imp.) [1656]; brown, star on face, hind legs below fetlocks white; foaled May, 1888. Bred by R. Calander, Newton, Scotland; sire, Barney (4829); dam, Barr Jean (3314). Exhibitor, Robt. Davies, Toronto.

SPAN OF CLYDES.

1st. Rose of Thorncliffe [1398]; bay, stripe on face, hind feet white; foaled April, 1892. Bred by exhibitor; sire, Energy (imp.) [1432] (7691); dam, Pride of Drummuir (imp.) [1325].

Daisy, (imp. in dam), [1935]; bay, blaze on face, hind legs white; foaled April, 1891. Bred in Scotland; imported by Graham Bros., Claremont; sire, The Ruler (8340); dam, Sally (imp.) [1319]. Exhibitor, Robt. Davies, Toronto.

2nd. Empress, [2173]; bay, stripe on face, four white feet; foaled May, 1891. Bred by Wm. Foster & Son, Humber; sire, Pride of Perth (imp.) [282] (2336); dam, Nettie, (368).

Jess, [2210]; chestnut, stripe on face, front feet and near hind foot white; foaled June, 1890. Bred by Wm. Foster & Son, Humber; sire, Lockhill (imp.) [532] (2950); dam, Lill [2171]. Exhibitors, Hendrie & Co. (Ltd.), Toronto.

3rd. Exhibitors, Jas. I. Davidson & Son, Balsam.

BEST MARE, ANY AGE.

1st. Candour, (imp.) [1656] Exhibitor, Robt. Davies, Toronto.

YEARLING COLT—ENTIRE.

1st. Black Prince [2240]; black; foaled May, 1895. Bred by exhibitor. sire, Queen's Own (imp.) [1708] (7176); dam, Candour (imp.) [1656]. Exhibitor, Robt. Davies, Toronto.

2nd. Boydston's Heir, [2238] (8300); bay, star on face, off front and hind feet white; foaled in 1895. Bred by exhibitor; sire, Grandeur (imp.) [1724] (6814; dam, Lady Boydston [2092]. Exhibitors, D. & O. Sorby, Guelph.

3rd. Pride of Balsam [2189]; bay, spot on face, black legs; foaled in March, 1895. Bred by exhibitors; sire, Tofty (imp.) [2123] (9452); dam, Kate Hill 2nd [1923]. Exhibitors, Jas. I. Davidson & Son, Balsam.

STALLION, ANY AGE.

1st. Grandeur (imp.) [1724] (6814). Exhibitors, D. & O. Sorby, Guelph.

FILLY, 3 YEARS OLD.

1st. Lady Gerty [2113]; dark bay, stripe on face, two white feet: foaled November, 1893. Bred by exhibitors; sire, Grandeur (imp.) [1724] (6814); dam, Lady Fleming *alias* Peggy (imp.) [2111] (10202). Exhibitors, D. & O. Sorby, Guelph.

FILLY, 2½ YEARS OLD.

1st. Boydston Lass 7th, [2286]; bay, patch on face, four white feet; foaled June 11th, 1894. Bred by exhibitors; sire, Westfield Stamp (imp.) [1819] (9467) 8212; dam, Boydston Lass 3rd [1927]. Exhibitors, Jas. I. Davidson & Son, Balsam.

2nd. Lady Grace, [2275] 8208; dark bay, star on face, near hind foot white; foaled in 1894. Bred by exhibitors; sire, Grandeur (imp.) [1724] (6814); dam, Lady St. Clair (imp.) [1205]. Exhibitors, D. & O. Sorby, Guelph.

3rd. Humber Nell; bred by exhibitors; sire, Macneilage (imp.) [1117] (2992); dam, Nettie of Castlemore [368]. Exhibitors, Wm. Foster & Sons, Humber.

YEARLING FILLY OR GELDING.

1st. Starlight [2278] 8301; bay, stripe on face, hind feet white; foaled in 1895. Bred by exhibitors; sire, Grandeur (imp.) [1724] (6814); dam, Evening Star (imp.) [994]. Exhibitors, D. & O. Sorby, Guelph.

2nd. Albani, [2280]; bay, star on forehead, black points; foaled May, 1895. Bred by exhibitors; sire, Tofty (imp.) [2123] (9452); dam, Highland Maid 7th, [1857]. Exhibitor, John Davidson, Ashburn.

3rd. Eva, [2277] 8302; bay, stripe on face, near front and off hind foot white; foaled in 1895. Bred by exhibitors; sire, Grandeur (imp.) [1724] (6814); dam, Lady St. Clair (imp.) [1205]. Exhibitors, D. & O. Sorby, Guelph.

EIGHTH ANNUAL REPORT

OF THE

SHIRE HORSE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The eighth annual meeting of the Shire Horse Breeders' Association was held in the Albion Hotel, Toronto, on February 7th, 1897.

PRESIDENT'S ADDRESS.

By H. N. Crossley, Rosseau.

As your President during the year 1896-7, I have been requested to write a brief address dealing with some of the salient features of the past year, which have in any way affected the interests of the Shire Horse Society, or have given the lovers of that best of all heavy draught breeds reason to believe that the future of their favorite horse—the Shire—is bright with promise.

Founded about the year 1890, when the tide of prosperity (which had for some years previously been at the height of fulness with respect to all breeds of horses), was then commencing to ebb, the Shire Horse Society has for seven years performed a good work, and proved the utility of its existence. The existence of our Society has been contemporaneous with the depression, and it will not be until the tide has turned that we can expect any very great degree of prosperity for the Shire horse. In the meanwhile, it is encouraging to note as year succeeds year, that in spite of the difficulties which we have had to encounter, at the end of each year we are still able to report that we have weathered the storm, that we have maintained the interests of the "Shires," and that after meeting all requirements, we have a balance in our treasury.

That a brighter future is in store for us, and that right soon, we have the very best reasons for believing. Reports from all quarters show that the price of all horse flesh is on the rise, show that heavy draught horses are hard to find, show that sales are being made, if not at fancy prices, at least at remunerative ones, and that heavy draught stallions are now once more being imported into this country and the United States, and that some of our Canadian stallions are being disposed of to syndicates at good figures. The increased demand for heavy draught stallions thus shown to exist is one of the brightest spots on the horizon at the present time. It shows very clearly that the business carried on in the immediate past by stallion owners, and the promises they have received of immediate future patronage, have fully justified them in acquiring fresh exponents of the breed they favor, and in increasing the stock on hand, which the late disastrous period had reduced to such a low level.

These remarks refer to all classes of the heavy horse, and are not confined to Shires. The interest of the Shire is identical with that of every breed of heavy horse, his destiny is the same as theirs, namely, the lorry or the heavy city vehicle, and whatever general causes affect the interests of one of our breeds of dray horses are sure to affect the whole.

Additional cause for hope should, I think, be found in the mining boom which is setting in all over the country, and though I do not claim that the heavy horse breeder will benefit so much from this boom as would certainly have been the case some fifty or one hundred years ago, when electrical science was not so far advanced as it is to-day; still from the pit's mouth to the ultimate handler of the precious metal is a long way, and one can foresee at a glance that from the crude ore to the pocket of the consumer there will be many opportunities for the horse to exert his strength and make his presence felt. Some portion at least of these precious metals will find its way into the pockets of the breeder, and mining in this country, if it does not pan out, but becomes a permanent industry, will open out a new field for the sale of heavy draught horses by reason of its own requirements and those of its attendant industries. Amongst sales of Shires made during the past year it has been a pleasure to note from time to time those made by my old time and respected show-yard rivals, Messrs. Stone & Wellington, of Welland; those made by Mr. Gardhouse, of Highfield, and several sales effected by smaller breeders, in addition to several sales of mares made by myself.

During the past year our breed has been well represented at all the principal shows. In numbers and quality it has compared well with any other breed, except perhaps in the stallion classes. Many good stallions have been brought to this country from time to time, but few appear to be bred here, with the very natural result, that though in the aged class we are able to make a fairly creditable show, in the younger classes we do not figure quite so well. This peculiarity, however, is not a special feature of the Shire exhibit, but is common to every breed of horse in this country, and to my mind indicates that the supply of thoroughbred mares is not what it should be, or yet would their male produce be sufficient to meet the demand for aged horses, were this demand as brisk as it has been in the past, or as lively as it is almost certain to be in the near future.

It was a pleasure to notice the re-entry of the Hendrie stables into the show-yard arena last year. On behalf of this Association I tender our best thanks to Mr. Hendrie for the very generous manner in which he contributed towards the prize list for Shires last spring.

One newly imported Shire, "Kilburn," the property of Berry & Geiger, of Hensall, shown at our fall fairs in 1896, attracted considerable attention by reason of his good quality and conformation. It is to be regretted that more of his calibre are not imported into this country.

Last year saw two innovations in the conduct and rules of our Society. Firstly, through the abolition of the Agriculture and Arts Association, which was legislated out of existence on the first of January, 1896, we were left to our own resources, and took the management of our Society, together with all its revenues, into our own hands. Secondly, at the instigation of myself, the members' fees, which hitherto had only been paid once, namely, when the Society was first formed or by a new member on joining the Society, were made annual fees and a source of yearly revenue to the society. Both these innovations have worked well and for the good of the Society.

I said in the early part of my report that the Society had proved its utility. An examination of the Secretary's eighth annual report reveals the fact that during our short existence we have recorded no less than 358 stallions and 122 mares of the Shire breed; 99 of these records were entirely lost in the fire at the corner of Queen and Yonge Streets, and many of those recovered are incomplete. Much time has been spent on the transcribing and renewal of these records by our esteemed Secretary and his able assistants, to whom the best thanks of this Society are due for their untiring zeal in this matter. Had it not been for their exertions many pedigrees of animals dead and gone would be unknown to us now, and the fact of their existence in this country at any time would have been forgotten.

I see from the Treasurer's report that we have once more a balance on hand, which, though small, is very satisfactory, and demonstrates our ability to conduct our own affairs on a sound financial basis.

As we have to lay by a small sum every year to meet the expense of publishing our first volume, which we hope to have to do shortly, and as our balance is not very large, I would deem it inexpedient this year to draw on this balance for the purpose of donating a sweep-stake prize to the spring horse show. But your directors will have an opportunity of discussing this matter for themselves. Last year we were enabled to donate a sweep stake prize to the Canadian Horse Show. The above work, as outlined, is not the work of a dead or stagnant society, but of an active and living one, with a great future before it.

It will rest with my successor in office to carry on the work which my predecessors, myself and our coadjutors have endeavored to perform to the best of our ability and in the best interests of your Society. In making way for my successor I can assure him with the utmost confidence that in the fulfilment of his duties he will ever receive from myself that help which he will have a right to expect from me, and which it will be a very great pleasure for me to render to him.

SECRETARY'S ANNUAL REPORT.

This Association has not made much progress for some time, but it looks if a change for the better may take place shortly. I have recorded eleven animals this year, one more than last; and I have received four Annual Members' fees. The registration fees now belong to the Association. We have on record 266 stallions and 115 mares, but have totally lost the pedigrees of ninety-two stallions and seven mares, some of the rest are partly destroyed. I had one of my clerks for over two weeks copying from a partly burnt lot that passed through the fire, so we are in a much better position than we were a year ago in case we want to print them. What we most need is more members, more registrations and more money.

At the shows this year one newly imported stallion appeared, a very good one, owned by Berry & Geiger, of Hensall, called "Kilburn" (imp.) [265], bred by D. Dewhurst, Lanark, England. The other exhibitors were H. N. Crossley, Rosseau; Morris, Stone & Wellington, Welland; J. M. Gardhouse, Highfield; Geo. Garbutt, Thistleton; Wm. Fenwick, Stanley Mills, and Hendrie & Co., Toronto.

TREASURER'S STATEMENT.

Receipts.			*Expenditures.*		
1896.			1896.		
Jan. 1st.	To cash on hand	$13 00	April 23rd.	By cash premium C. H. Show..	$20 00
Dec. 31st.	" four members	12 00	May 1st.	post cards for meeting	1 75
31st.	" registrations	12 00	Dec. 31st.	com. on 11 pedigrees at 35c.	3 85
			31st,	cash on hand	11 40
		$37 00			$37 00

H. WADE,
Secretary-Treasurer,
Toronto.

ELECTION OF OFFICERS.

The following officers were elected for the ensuing year:

President: H. N. CROSSLEY, Toronto.

Vice-President: W. E. WELLINGTON, Toronto.

Directors: JOHN GARDHOUSE, Highfield; WM. HENDRIE, jr., Hamilton; WM. WILKIE, Toronto; I. Y. ORMSBY, Woodstock; JAS. M. GARDHOUSE, Highfield; GEO. GARBUTT, Thistleton; JOHN SEMPLE, Tottenham.

Delegate to Industrial Exhibition: JOHN GARDHOUSE, Highfield.

Delegates to Western Fair: H. WADE, Toronto; H. N. CROSSLEY, Rosseau.

Secretary-Treasurer: H. WADE, Toronto.

PRIZE LIST AT TORONTO INDUSTRIAL FAIR.

Following are premiums won by Shires at the Industrial Exhibition, Toronto, August 31st to September 12th. 1896.

Stallion, Four Years Old and Upwards.

1st. Pride of Hatfield (imp.) [256] (13103); bay, stripe on face, three white legs; foaled in 1890. Bred by Geo. Smales, Yorkshire, England; imported by exhibitors; sire, Lancashire Lad 2nd (1365); dam, Flower (16664). Exhibitors, Morris, Stone & Wellington, Welland.

2nd. Duke of Blagdon (imp.) [257]; bay, dark points; foaled August, 1892. Bred by Clement Keevil, New Malden, England. Imported by exhibitor; sire, Blagdon Lincoln (12797); dam, Blagdon Brunette, by Lincolnshire Lad. Exhibitor, J. M. Gardhouse, Highfield.

3rd. Darnley (imp.) [183] (3585); brown, foaled in 1882. Bred by Thos. Johnston, Peterborough, England; imported by exhibitor; sire, Champion (450); dam by Thumper (2137). Exhibitor, Geo. Garbutt, Thistleton.

Stallion, Three Years Old.

1st. Kilburn (imp.) [265]; brown, stripe on face, hind pasterns white; foaled June, 1893. Bred by D. Dewhurst, Lanark, Scotland; imported by Berry & Bell, Hensall; sire, Herod (11609); dam, Black Bess. Exhibitors, Berry & Geiger, Hensall.

Stallion, any Age.

1st. Kilburn (imp.) [265]. Exhibitors, Berry & Geiger, Hensall.

Filly, Three Years Old.

1st. Rosseau Propriety (imp.) [99]; grey, four black legs; foaled in 1893. Bred By J. T. Browne, Doncaster, Yorkshire, England; imported by exhibitor; sire, St. Hybald (4068); dam, Althorpe Dewdrop. Exhibitor, H. N. Crossley, Rosseau.

2nd. Belle [106], bay, stripe on face, white on off forefoot, hind feet white; foaled in 1893. Bred by exhibitors; bred by exhibitors; sire, Prince Charles [196]; dam, Alice (imp.) [33]. Exhibitors, Morris, Stone & Wellington, Welland.

3rd. Fanny [93]; brown, stripe on face, hind feet white; foaled in 1893. Bred by exhibitors; sire, Prince Charles [196]; dam, Elsie Morin (imp.) [34] Exhibitors, Morris, Stone & Wellington, Welland.

Filly, Two Years Old.

1st. Rival [109]; dark bay, stripe on face, off hind foot white, stockings on hind feet; foaled in 1894. Bred by exhibitors; sire, Prince Charles [196]; dam, Queen [65]. Exhibitors, Morris, Stone & Wellington, Welland.

Yearling Filly or Gelding.

1st. Dolly [110], bay, front feet white, stocking on near hind foot; foaled in 1895. Bred by exhibitors sire, Pride of Hatfield (imp.) [256] (13103); dam, Lottie (imp.) [35]. Exhibitors, Morris, Stone & Wellington, Welland.

2nd. Rosseau Queen (imp.) [98]; bay, two fetlocks white; foaled in 1892. Bred by J. T. Browne, Doncaster, Yorkshire, England; imported by exhibitor; sire, Trent Conqueror (12573); dam, Althorpe Excelsior. Exhibitor, H. N. Crossley, Rosseau.

3rd. Trilby [111], brown, star on forehead, spot on nose, stockings on hind feet; foaled in 1895. Bred by exhibitors; sire, Pride of Hatfield (imp.) [256] (13103); dam, Queen [65]. Exhibitors, Morris, Stone & Wellington, Welland.

BROOD MARE, WITH FOAL OF SAME BREED BY HER SIDE.

1st. Daisy [82], brown, white face, hind legs white; foaled in 1891. Bred by exhibitors; sire, Chieftain 2nd (imp.) [194] (5723); dam, Elsie Morin (imp.) [34]. Exhibitors, Morris, Stone & Wellington, Welland.

2nd. Queen of Althorpe (imp.) [10], light bay, blaze on face, hind legs white; foaled in 1887. Bred by J. T. Browne, Doncaster, Yorkshire, England; imported by exhibitor; sire, Sliding Scale (6405); dam, by Sir Roger (2026). Exhibitor, H. N. Crossley, Rosseau.

3rd. Sham [108], bay, stripe on face, four white feet; foaled June, 1891. Bred by Chas. Jackson, Mayfield sire, Samoon the Great (imp.) [263] (2896); dam, Bounce (imp.) [44].

FOAL OF 1896.

1st. Laura [112], bay, stripe on face, near front and both hind legs white; foaled May, 1896. Bred by exhibitors; sire, Pride of Hatfield (imp.) [256] (13103); dam, Daisy [82]. Exhibitors, Morris, Stone & Wellington, Welland.

2nd. My Queen [115], bay, white face, four white feet and legs to knees and hocks, white patches on near side of belly; foaled May, 1896. Bred by exhibitor; sire, Bravo III. (imp.) [250] (12835); dam, Queen of Althorpe (imp.) [10]. Exhibitor, H. N. Crossley, Rosseau.

3rd. Sampson of Stanley Mills [264], bay, stripe on face, hind legs white; foaled May, 1896. Bred by exhibitor; sire, Diseworth Blue (imp.) [254] (9189); dam, Sham [108]. Exhibitor, Wm. Fenwick, Stanley Mills.

MARE, WITH TWO OF HER PROGENY.

1st. Queen of Althorpe (imp.) [10]. Exhibitor, H. N. Crossley, Rosseau.

SPAN OF SHIRE HORSES.

1st. Nell [113], brown, with star on forehead; foaled May, 1886. Bred by Jas. Gardhouse, Highfield; sire, Hero (imp.) [266] (3716); dam, Maggie May, by England's Glory (imp.) [79] (737).
Kate [114], dark bay; foaled May, 1891. Bred by Jas. Gardhouse, Highfield; sire, King of the Castle (imp.) [71] (3171); dam, Nell [113]. Exhibitor, J. M. Gardhouse, Highfield.

BEST MARE OF ANY AGE.

1st. Rosseau Propriety (imp.) [99]. Exhibitor, H. N. Crossley, Rosseau.

THIRD ANNUAL REPORT

OF THE

CANADIAN HORSE BREEDERS' ASSOCIATION.

LIST OF MEMBERS FOR 1897.

Name.	Address.	Name.	Address.
Alexander, D. W	Toronto.	Irving, Thomas	Winchester.
Bowker, A. G., V.S	Woodstock.	Johnston, A	Greenwood.
Beck, Adam	London.		
Bond, R	Toronto.	Lowes, J. F	Brampton.
Brereton, C. H	Bethany.	Lawrence, W. A	Milton.
Beith, R	Bowmanville.		
Brown, W. C	Meadowvale.	Macdonald, John	Toronto.
		Miller, R	Brougham.
Cox, E. W	Toronto.	Myles, R	Toronto.
Carruthers, Jas	"	Moor, Geo	Waterloo.
Cargill, H., M.P	Cargill.	McMaster, Capt. W. F	Toronto.
Christie, Wm	Toronto.	McEwen, R	Byron.
Crossley, H. N	Toronto.	McKinnon, D. P	South Finch.
Canfield, Jas	Woodstock.	McCrae, D	Guelph.
Crow, Thos. A	Toronto.		
Cochrane, Jas. A	Hillhurst, Que.	Ness, R	Howick, Que.
Cox, E. S	Toronto.		
Cockburn, Geo	Baltimore.	Pepper, Geo	Toronto.
		Patterson, S	Port Hope.
Davidson John	Ashburn.		
Davies, Robert	Toronto.	Ramsay, A. G	Hamilton.
		Rolfe, Aug	Toronto.
Edwards, W. C., M.P	Rockland.	Robertson, J. Ross	"
Elliott, C., V.S	St. Catharines.	Robson, J. E	Ilderton.
Eard, C. E., V.S	Simcoe.	Rutherford, J	Portage la Prairie.
Fuller, S. B	Woodstock.	Smith, Dr. A	Toronto.
Foy, J	Toronto.	Smith, Hugh	Claude.
		Sorby, D	Guelph.
Graham, J. D	Toronto.	Sorby, O	"
Graham Bros	Claremont.	Smith, W. H	Toronto.
Gibson, Richard	Delaware.		
Gardhouse, J. M	Highfield.	Ten Eyck, W. H	Hamilton.
		Taylor, J. B	Toronto.
Harris, T. T	Oakville.		
Holderness, John	Toronto.	Wood, Hon. S. C	Toronto.
Hendrie, Wm., Jr	Hamilton.	Wellington, W. E	"
Hodgson, T., V.S	Toronto.	Wilkie, W	"

CANADIAN HORSE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The third annual meeting of the Canadian Horse Breeders' Association was held in the Albion Hotel, Toronto, at 2 p. m., on February 5th, 1897.

Members present: Robt. Davies, President, Toronto; D. McCrae, Guelph; A. Johnston, Greenwood; S. J. Spencer, London; Jas. M. Gardhouse, Highfield; W. C. Brown, Meadowvale; Capt. McMaster, Toronto; R. Beith, M.P., Bowmanville; John Macdonald, Toronto; R. Graham, Claremont; R. McEwen, Byron; O. Sorby, Guelph; John Holderness, Toronto; R. Bond, Toronto; Wm. Wilkie, Toronto; A. Good, Toronto; J. D. Graham, Toronto, and H. Wade, Secretary, Toronto.

Mr. WADE then read the minutes of the last annual meeting, and it was moved by H. N. CROSSLEY, seconded by ROBT. BEITH, that the minutes be adopted. Carried.

REPORT OF THE SECRETARY.

The Secretary then read the following report:

There is not much of importance to chronicle by your Secretary since the semi-annual meeting held in this place on the 8th of September last, a full report of which, also containing the prize awards for 1896, is published in the Report of the Live Stock Associations for 1895 and 1896. The constitution is also published in the 50th Annual Report of the Agriculture and Arts Association.

The object of this Association is to encourage the improvement of all the better breeds of horses, in every possible way, and especially by holding and assisting shows at different times of the year. At the last Spring Canadian Horse Show $2,055 was paid out in premiums alone to the breeders and owners of good horses. It is the intention of this Association to take part again with the Country and Hunt Club in holding the Third Annual Joint Exhibition in the Armories on the 29th and 30th of April and 1st of May next; and it is the duty of this Association to do all they can to make it a success.

The Committee appointed at the last meeting of this Association has already waited on the Provincial Government. The Committee that attended consisted of Dr. A. Smith, Vice-President; Arthur Johnston, Greenwood; H. N. Crossley, T. B. Taylor, Jas. Russell, and H. Wade; the members from outside the city not attending. Mr. Wade introduced the deputation, and Mr. A. Johnston in a few well chosen words explained that if this Association and the Canadian Horse Show was to have a prosperous continuance it was absolutely necessary that the same grant as last year should be given.

Mr. Wade also stated that last year they obtained a grant of $2,000, and paid out $2,055 in prizes. He also read part of a letter from R. Beith, M. P., who could not attend. He said, "You should get a sum equal at least to last year. The horse industry has suffered perhaps more than any other branch of the live stock industry within the last five years; and large fortunes have been lost by those who have done most for it in this country; but the signs are that the dark cover is at last turned, prices are improving, good animals were never harder to find, and my opinion is, that within the next two years horses will be back to old time prices."

The Hon. Mr. Hardy promised that Mr. Dryden would consider their request; and the Minister of Agriculture informed the deputation that the grant would in all probability be renewed.

THE OFFICERS LAST YEAR WERE:

From the Clydesdale Association.—Robt. Davies and David McCrae
" *Shire* " —H. N. Crossley and John Gardhouse.
" *Hackney Horse Society.*—Robt. Beith, M.P., and N. Awrey
" *Thoroughbred Association.*—Dr. A. Smith and Wm. Hendrie, jr.
" *Trotting and Pacing Horse Association.*—Leeming Carr, M. D., and H. Cargill, M. P.

From which Robt. Davies was elected President, and Dr. A. Smith, Vice-President.

The Committee representing this Association on the management of the Horse Show was Robt. Davies, Dr. A. Smith, N. Awrey, Wm. Hendrie, jr., R. Beith, M.P., and your Secretary; and, as you are aware, Mr. Davies, our President, was unanimously chosen Chairman for the Joint Committee of Management

At a Joint Committee Meeting held on the 20th of January, by the last year's Committee, a new basis of partnership was arrived at, by which we will participate in half of the profits if any accrue, and assume half of the liabilities.

The time for holding the next Show was fixed for Thursday, Friday and Saturday, April 29th, 30th and May 1st next, subject to the approval of the Canadian Horse Breeders' Association

It was also agreed that a Committee of seven be appointed by each Association to form the Joint Committee to transact the business of the Horse Show.

It is important that the Committee of seven from this Association should consist of gentlemen who can and will attend the meetings as much as possible.

The election of Directors for 1897 has to be made at this meeting by ballot, from this Association, and representing as far as possible the different Horse Breeders' Associations now in existence.

Two representatives to the Industrial Exhibition, R. Beith, M.P., and H. Cargill, M.P., were last year chosen.

Two representatives to Western Fair, London.

All of which is respectfully submitted.

H. WADE,
Secretary.

TREASURER'S STATEMENT.

The following gives a correct statement of the transactions of the Canadian Horse Breeders' Association for the year ending December 31, 1896. The report as read was adopted:

RECEIPTS.

1896.			
April 10th—	Cash, Government grant....		$2,000 00
" 10th—	" Prince of Wales' prize.		48 00
" 22nd—	" Harry Webb, special..		100 00
" 28th—	" Clydesdale Horse Association.....		100 00
" 28th—	" Hackney Society.....		50 00
" 28th—	" Shire Association		20 00
" 28th—	" Entry fees.....		318 00
" 28th—	" Proportion of profit from Horse Show...		273 26
Dec. 30th—	" fifty members..		50 00
Total			$2,939 26

EXPENDITURES.

1896.		
April—By cash, premiums paid to breeding classes		$2,655 00
" —Judges fees		285 00
Dec. —By postage.....		2 52
" —Stationery, telegrams		6 83
" —Balance, cash on hand..... ...		589 91
Total		$2,939 26

(Signed) H WADE,
Treasurer.

ELECTION OF OFFICERS.

The election of officers resulted as follows :

President : ROBERT DAVIES, Toronto.

First Vice-President : Dr. A. SMITH, Toronto.

Second Vice-President : R. BEITH, M.P., Bowmanville.

Directors : Moved by R. MCEWEN, seconded by D. MCCRAE, that the representatives recommended by the different breeders' associations be the directors of the Horse Breeders' Association. Carried.

Representing Hackney Association : ROBERT BEITH, M.P., Bowmanville, and JOHN MACDONALD, Toronto.

Representing Shire Horse Association : H. N. CROSSLEY, Toronto, and W. E. WELLINGTON, Toronto.

Representing Clydesdale Horse Association : ROBERT DAVIES, Toronto, and ROBERT MILLER, Brougham.

Representing Thoroughbreds : Dr. A. SMITH, Toronto, and WM. HENDRIE, Jr., Hamilton.

Representing Pacing and Trotting Association : Dr. HODGSON and JOHN ROSS ROBERTSON, M.P., Toronto.

Committee appointed to meet the Country and Hunt Club : ROBERT DAVIES, Chairman, Toronto ; Dr. SMITH, Toronto ; WM. HENDRIE, Jr., Hamilton ; R. BEITH, M.P., Bowmanville ; H. N. CROSSLEY, Toronto ; E. W. WELLINGTON, Toronto ; JOHN MACDONALD, Toronto ; ROBERT MILLER, Brougham.

Secretary, H. WADE, Toronto.

Delegates to Indu trial : ROBERT BEITH, M.P., Bowmanville ; H. N. CROSSLEY, Toronto.

Delegates to Western Fair : R. MCEWEN, Byron ; O. SORBY, Guelph.

Delegates to Ottawa : Mr. HUTCHISON, M.P., Ottawa ; ROBERT GRAHAM, Claremont.

Delegates to Montreal : JAMES A. COCHRANE, Hillhurst, Que.; ROBERT NESS, Howick, Que.

CORRESPONDENCE.

A communication was read from J. ROSS ROBERTSON, M.P., stating he would be happy to do anything he could to help the Association along.

A letter was read from Dr. LEEMING CARR, secretary of the Trotting and Pacing Association, stating he would like to have two representatives appointed in Toronto to represent their Association, as they were so far away they could not attend the meetings.

Mr. T. H. HASSARD, V.S., of Millbrook, sent a communication requesting that classes five and six of prize list for 1896 for three-year olds be changed to two and three-year-olds.

A communication was also received from Mr. THOMAS IRVING, of Winchester, asking if the dates of the Canadian Horse Show could not be changed to April 15, 16 and 17 instead of 29th, 30th of April and May 1st.

A communication was received from the Hon. JOHN DRYDEN requesting that the committee of gentlemen from the Horse Breeders' Association come before the Government and ask for the grant.

Mr. Robt. Davies explained to the members present that a Committee from this Association had waited on the Government and asked that the grant of $2,000 for 1896 be renewed for 1897, to give as prizes in breeding classes at the Spring Horse Show. He also stated that they had received a favorable reply.

Mr. Wade: At the last meeting held in the Queen's Hotel, Mr. Houston and myself were appointed a sub-committee to draw up a prize list and submit at the next Joint Committee Meeting, which takes place to-night. Mr. Houston sent me up a draft of the prize list, but I did not quite agree with him, so after consulting with some of the breeders I have drawn up one myself. He only allowed some $1,055 for breeding classes, while he gave to harness and saddle classes over $1,800.

Mr. Robt. Davies stated that the Country and Hunt Club had agreed to contribute $1,000 or more to the prize list, and now the question is what portion of this money will the Breeders' Association contribute to the prize list. Can we afford to give a little money so as to make the Show a success, or do you feel disposed to carry it on yourself?

Mr. McCrae was of the opinion that the $2,000 should go to nothing but breeding horses, and if the Hunt Club did not wish to agree to that we could carry the Show on ourselves.

Mr. Crossley said that we all knew the Country and Hunt Club do a great deal towards swelling up the gate receipts, and if we wish the Show to be a success we will have to submit a little. After a little further discussion on the matter, the following resolution was passed:

Moved by Arthur Johnston, seconded by D. McCrae, that the Committee appointed by this Association be requested to make the best possible arrangements they can with the Country and Hunt Club in carrying on the Canadian Horse Show. Carried.

It was also moved by D. McCrae, seconded by A. G. Brown, that our Directors be instructed to secure an amount in the neighborhood of $2,000 for prizes in the breeding classes this year. Carried.

The dates of the Show were then taken up, and Mr. O. Sorby said he would not be able to come to the Show with his horses if it was held as late as 29th and 30th of April and 1st of May.

Mr. A. G. Brown: I do not think the 1st of May will suit the farmers at all; I know if I had ten horses I could not send one if the Show was that late.

Mr. Robt. Davies stated that he had been in communication with several horsemen, and they would like to have our Show the week before or after the Boston Show.

Mr. McCrae also thought the 1st of May was too late for the farmers, and he moved that the Horse Show be held the week previous to Boston; seconded by R. Beith, and carried.

Mr. Wade: Another point I would like to touch on just now is, will we charge $3 for each entry this year? Last year the entry fee was $2 and the year before $1.

It was the general opinion of the meeting that $2 was sufficient for entering in the breeding classes, so the entry fee was left the same as last year.

Mr. Wm. Wilkie: I think there was one prize given last year which was omitted this year, that is the prize for heavy draught horses.

Mr. Wade said the Clydesdale Horse Association had voted a prize for that this year.

After a little further discussion it was finally moved by Wm. Wilkie, seconded by J. M. Gardhouse, that a class for draught teams shown in harness be provided for in the prize list of the next Horse Show, and that $100 be the amount given in the proportion of $50 to the first, $30 to the second and $20 to the third. Carried.

Mr. D. McCrae spoke strongly in favor of this motion.

The meeting then adjourned at 4.45 p m.

HINTS ON HORSE BREEDING.

By R. McEwen, Byron.

To the question, "Who is the most miserable man?" Johnston answered, "He who cannot read on a rainy day," and there is a world of truth in the statement; but there are degrees of misery, and the lot of the average breeder of horses is to-day not just as happy as it could be. Can it be claimed without contradiction that the majority of those engaged in the enterprise are making a profit out of it? I fear not. There is no denying that farmer's stables are occupied by a full complement of groom horses, of one description and another, and few there are but have some they are anxious to part with. We hear from them that as it does not pay they will stop breeding, and the agricultural papers instead of attacking the cause as vigorously as they might, have been writing rather encouragingly that although the trade is lifeless prospects are brightening. These hopes, however, are not being realized as speedily as predicted, and the breeder continues despondent and careless. It is surely better to probe to the bottom than heal over a festering wound, therefore let us recognize the fact that there are amongst us too few successful and too many failing in profitable horse breeding, that there is a lack of buoyant, hopeful anticipation in the enterprise and a consequent inattention to well-fixed principles in the mating and subsequent management of mares and their progeny.

In travelling through the country do we not see large numbers of horses for sale of a class which could not be raised for the money asked for them, yet because there is no ready market, dealers avoid buying them. Too many breeders will not use their heads or heed the alarm that has been sounded all over the country that every mare must be bred with an object in view, the getting of a horse which is suited for a special, as contrasted with a general purpose. Haphazard results in misfits, and serves at best to swell an already crowded market. It is no argument to say that horses are bred more carefully here than in any other part of the continent. Rather let us fairly admit that there is abundant room for improvement, that there are serious faults in our work, and an important step is taken towards removing those faults; but so long as we fold our arms and wrap ourselves in the cloak of self-sufficiency, we retard not only our own but general progress. Others will catch enthusiasm from our lack of it and take the lead. We must energetically strive to occupy. Several years ago a couple of British officers spent considerable time in visiting amongst every important town in the eastern part, at least, of this Province, to buy suitable remounts for the army, also to see if there were to be found in sufficient numbers to warrant stationing here a purchasing agent. The result was a few horses were exported and found most satisfactory, but these officers reported that the supply was too limited. Since then there has been ample time to mend matters, but I see last week out of a large shipment for army purposes from New York, only a very small proportion is reported as being Canadian, showing that while the British army officials are still inclined to deal with us, we have not stocked up with what they want, although the breeding material is here to do it with. Here is a customer coming to our doors, explaining with pains the requirements and the steady demand, offering prices at which horses can be raised at a good profit, yet he is driven to rival breeders for his supply. What stronger object lesson can I mention to show the necessity of breeding that for which there is a staple demand?

Whilst care is needed in the selection of a stallion, it is too frequently the case that the best mare on the farm is kept in harness until sold, and the unsaleable is put to breeding, reproducing her weakness and defects—a system I can fitly compare to that of selling every available product off the farm and retaining nothing to keep up its fertility. Carrying on this practice the follower of it, in a few years, finds himself no longer in the advance guard of his profession, and his customers seek out others who are marching forward with our wonderfully progressive age. It is a waste of precious time for any man depending upon the fruits of his skill and enterprise catering for public wants, not to aim to anticipate what that public demands; fail to do it, and the result is ultimately far

from uncertain. It is the more than ordinary clever man, and he receives scant praise for his pains, who can sell a customer what he does not want. Far better is it to win approval than condemnation, and if possible provide for a man so satisfactorily that he will return to you with confidence.

A man's success in breeding is estimated by his judgment in mating, followed by his skill in feeding and developing. Mistakes in some lines can be remedied, lost ground regained, but in regard to animals seldom ever. A colt is not a piece of lifeless clay that can, by fits, be moulded into varying fancies. It is essential to possess a well formed ideal to start with, then there must follow a determined striving to produce it. The cause of a failure must be studied and in the future avoided. Because one man breeds a horse of extra merit, how rash of his neighbor to think that he has only to use the same sire to obtain equally good results—never studying critically the difference in conformation of the two dams, nor their progenitors. An authority has said that if he had to train a child he would wish to start with its grandfather, and if we grant this would be an advantage we must admit the wonderful varied resources at our command in the reproduction of the lower animals, the incentive to discard those with serious faults for the use of those whose ancestry commands most approval.

A source of serious loss to many breeders is that spare-the-feed and stunt-the-colt sort of policy they cling to, and they can rest assured of the fact that so long as they continue to adopt this policy a full measure of success can never attend their efforts. Can you name a single noted breeder of horses, cattle, sheep or pigs who does not feed at least liberally. Hosts of horses remain on the hands of their owners for no other reason than from their lack of condition. Is there any wonder that this class complains that there is no money in the business? How could it be otherwise when they persist in going contrary to the methods invariably followed by those who have made a specialty of the business and carried it to a successful issue. Unless a man not only notes the mistakes as well as the good results attained by his fellows, but is prepared to act upon what he sees, many valuable aids to him in his work are lost, and there is no better place to secure such information than at our stock shows. The lull in the demand for mediocre specimens will not prove an unmixed evil if it forces from us more care and attention, and instils in us higher ideals. It is not by the merits of scattered individuals we will earn a name for our country as a famous breeding ground, but by the general excellence throughout the length and breadth.

These random thoughts I have written touching some of the drawbacks underlying the horse industry as it is to be found to-day are not in any way intended to discourage people from continuing in it, but rather to draw attention to some of the causes of the lack of success in producing animals of the highest class. It would be a mistake to gather from my remarks on this subject that the trade is not worth following. On the contrary, I am quite convinced of its profitableness.

DIRECTORS' MEETING.

A meeting of the directors was held at the office of the Jockey Club, Toronto, on February 19th, 1897, at 3 p.m.

Present: Messrs. R. Beith, M.P., H. N. Crossley, W. E. Wellington, John Macdonald, Robert Davies and H. Wade.

Mr. Robert Beith, in the absence of the President at the commencement of the meeting, presided.

Tha Secretary explained that the two gentlemen, J. Ross Robertson, M.P., and Thomas Hodgson, V.S., elected as Directors to represent the Trotting and Pacing Horse Association, both regret that on account of press of other business they cannot accept the office, but wish the Horse Breeders' Association every success.

It was resolved, that Mr. H. Cargill, M.P., of Cargill, and Mr. E. W. Cox, of Toronto, be tendered these offices.

The matter of the one hundred dollar premium for heavy draught teams, irrespective of breeding, voted on at the annual meeting of this Association, was then considered.

At the joint meeting of the Horse Show Committee from this Association, held with the Country and Hunt Club, it was found impossible to grant this premium from the $2,000 to be given by the government for this year, so if this sum was to be given as requested by the annual meeting, it would have to come out of the surplus from 1896.

On motion of Robert Davies, seconded by W. E. Wellington, the following Sweepstakes Premium was passed: Sweepstakes, given by the Canadian Horse Breeders' Association for draught teams shown in harness, $50 for first prize, $30 for the second, $20 to the third and a commended ribbon to the fourth. Entry fee $2.

It was also resolved, that the Clydesdale Association be requested to change the wording of their Sweepstakes to read: For the best draught pair of mares or geldings, to be pure bred Clydesdales, instead of to be sired by a registered Clydesdale stallion, and teams entered in this class not eligible for the Canadian Horse Breeders' Prize.

JOINT COMMITTEE MEETING.

TORONTO, Jan. 26th, 1897.

Pursuant to notice given, the committees of the Canadian Horse Breeders' Association and Country and Hunt Club, met in the Queen's Hotel at 8 p.m., to come to terms of agreement in carrying on the next Spring Horse Show.

The following members were present:

Representing the Canadian Horse Breeders' Association: Robert Davies, Dr. A. Smith, H. N. Crossley, John Macdonald and Henry Wade.

Representing the Country and Hunt Club: Edmund Bristol, Major J. D. Hay, Geo. W. Beardmore, C. W. Clinch, Lorne Campbell and Stewart Houston.

On motion of Mr. Houston, seconded by Mr. John Macdonald, it was moved and adopted that Mr. Robert Davies take the chair.

After a lengthy discussion the following resolution was passed:

Moved by J. D. HAY, seconded by H. N. CROSSLEY, That the Canadian Horse Breeders' Association and Country and Hunt Club agree that all grants and revenues be put into one common fund, and that all profits and expenses be shared and shared alike; and that all classes and prizes be fixed by the joint committee; and that the said Associations failing to raise by grants or private subscriptions, or otherwise, the sum of $3,000 for prizes, this agreement to be reconsidered as to its terms. Carried.

Moved by Dr. SMITH, seconded by C. W. Clinch, That the dates of the Canadian Horse Show be Thursday, Friday and Saturday, April 29th and 30th and May 1st, subject to approval of the Canadian Horse Breeders' Association. Confirmed.

On motion of Mr. EDMUND BRISTOL, seconded by Mr. JOHN MACDONALD, It was resolved that Mr. Henry Wade and Mr. Stewart Houston be a committee to revise the prize list and submit a report to the next joint meeting. Carried.

On motion, it was agreed that a committee of seven be appointed by each Association, viz.: The Canadian Horse Breeders' Association and the Country and Hunt Club Association, to form a joint committee to transact the business of the Horse Show. Carried.

Moved by EDMUND BRISTOL, seconded by Geo. W. BEARDMORE, That a prize of $50 be given for a design for a poster for 1897, and said design to be submitted to a subcommittee. Carried.

The meeting adjourned with a vote of thanks to the chairman for the able manner in which he presided over the meeting.

JOINT COMMITTEE MEETING.

A meeting of the joint committee was held in the Queen's Hotel at 8 p.m., on Feb. 5th, 1897.

The following members were present :

Representing the Horse Breeders' Association : Robert Davies, Chairman ; John Macdonald, H. N. Crossley, Robt. Miller, Brougham ; Robt. Beith, M.P., Bowmanville ; Dr. A Smith and Henry Wade, Secretary.

Representing the Country and Hunt Club : Major J. D. Hay, Edmund Bristol, J. Lorne Campbell, C. W. Clinch, R. O. McCulloch and Stewart Houston, Secretary.

Mr. WADE read the minutes of the last meeting, which were confirmed.

Mr. ROBT. DAVIES stated to the members present that he had had several interviews with breeders, and they would like to have our show the week before the Boston one. He also said a number of the farmers would not be able to come to the show if it was held as late as the first of May.

Mr. BRISTOL : I think we could arrange to have the breeding classes through by Friday night, then they could leave on Saturday and be home in time to commence work on Monday.

Mr. BEITH and Mr. CROSSLEY were of the opinion that the 29th and 30th of April and May 1st was rather late for the breeders, but as far as they were personally concerned they were quite agreeable to the dates.

Major HAY thought the 28th, 29th and 30th of April would probably suit the breeders better, as it would give them time to get home on Saturday without disturbing the show in any way.

Mr. BRISTOL differed, as he thought Saturday, the first of May, would be the best day on account of so many having a half holiday.

On motion of Mr. ROBT. BEITH, M.P., seconded by Major HAY, it was finally resolved that the dates of the Canadian Horse Show be Thursday, Friday and Saturday, April 29th and 30th and May 1st. Carried.

Mr. WADE : The first thing now would be to arrive at a decision as to the amount of money to put into the prize list.

Mr. HOUSTON thought that the money granted by the Government and the money raised by subscription should go into one common fund and that they should share alike —that the $2,000 should not be for breeding classes alone ; he also stated that the Hunt Club's guarantee of $1,000 was all right, and that it may be $1,500 or $2,000.

Mr. ROBT. DAVIES : The committee that waited on the Government asked for $2,000 to be granted for breeding classes, and we feel that we are duty bound to spend that amount of money for such. We are like trustees of that money from the Government, and they will want to know what we have done with it.

Mr. HOUSTON was of the opinion that it was not necessary for so many prizes to be given in the breeding classes, such as having a fourth prize in a class.

Mr. ROBT. BEITH suggested that the Breeders' Association might be able to take over some of the Hunt Club classes.

Mr. HOUSTON contended that they would not be able to make the prize list more than $3,100, but Mr. Wade thought it should not be less than $3,500, not including special prizes.

Mr. BRISTOL said he saw the point, and was inclined to agree with Mr. R. Beith's suggestion as to having one or two of the Hunt Club classes taken over by the Breeders' so as to bring the breeding class prizes up to $2,000, the amount the Government expected they should give to that class.

In order to arrive at a special partnership the Breeders' offered to take over the roadster classes and the saddle horse classes, so that the $2,000 granted by the Government should be used for breeding horses, and this was agreed to.

The amount of money to be given in prizes was again referred to briefly, and it was moved by Edmund Bristol, seconded by Robt. Beith, M.P., that the partnership basis of the prize list should be $3,500, not including special sweepstakes. All other donations to go to the common fund, and the profits or losses to be equally divided between the Breeders' and the Hunt Club.

THIRD ANNUAL CANADIAN HORSE SHOW.

The Third Annual Canadian Horse Show under the auspices of the Canadian Horse Breeders' Association and the Country and Hunt Club of Toronto was held at the Armories, Toronto, April 29th to May 1st, 1897, and was, like its predecessors, a success both financially and as an exhibition.

The late date on which Easter fell this year had the effect of making the time selected for the show somewhat later than usual. This, while suiting the city people, was not so satisfactory to the farmers, inasmuch as the latter were busy with their spring work just then and consequently could not attend the show in any numbers, and many owners of stallions had their horses already on their routes and could not very well take them off to exhibit them. This accounts for the lessened number of entries in some of the breeding classes. To prevent this for the future, the show will be held earlier in the season.

A new departure was made this year in the reduction of the price of admission during the whole period of the show to the modest sum of 25c. For this popular price it was possible also to secure a comfortable seat without further charge. It will thus be seen that the interests of the public were well looked after, while the fact that, in spite of the price of admission being thus cut in half, the gate receipts, nevertheless, were as good as they were, shows that the public appreciated the reduction. Had not the weather been so wretchedly wet nearly all day on the Saturday (on which day in previous years the receipts have always been largest) a considerable increase in the gate money would have resulted. It must also be remembered, in comparing the receipts of 1897 with those of 1896, that this year the show only lasted for three days instead of four as in the year previous. The good showing made this year has only been attained by maintaing the strictest economy in the conduct of the show consistent with efficiency.

The amounts offered in prizes in cash and plate totalled nearly $4,000, the breeding classes especially being granted most substantial amounts. Never was the competition keener in most of the classes, while the quality was better than ever before. Hackneys, as usual, were well represented and were as great favorites as ever. This popular breed is evidently taking well in this country, if one may judge by the numerous youngsters, both pure and half-bred, which were forward at the show and gave a good account of themselves in the competitions in various classes. Mr. Beith scored a popular victory in carrying off with Banquo and Jessica both the medals presented by the English Hackney Horse Society for the best stallion and the best mare or filly respectively out of an imported sire and imported dam. It is interesting to note in this connection that Banquo and Jessica are full brother and sister.

Thoroughbred and standard-bred stallions were both out in very fair numbers.

The show of saddle and harness horses was the best ever seen in Toronto—an evidence that breeders are paying greater attention to raising such horses as bring in, when matured and well fitted, prices that well repay the owners for the time and trouble spent on them. Educating the breeder in this line is part of the work of a show like the Canadian Horse Show, and it is manifest that lessons learnt at previous shows have had a beneficial effect on exhibitors.

The benefits derived from holding a show like this every year are many and great. In the first place the liberal prize list encourages the breeder to try to produce the best animal he can, as at such a show an inferior animal has no chance to win. In order to secure the best he is encouraged to buy for his own and his neighbor's use a first class sire and he is also careful to breed only his best mares to him. His neighbors seeing him do this naturally fall into line, and a general improvement of the horseflesh in that district is the result.

Then, apart from the money worth of the prizes offered there is the opportunity afforded by the show of bringing the buyer and seller together. To sell most advantageously horses must be well trained and groomed, and most of those brought to the show have received the necessary care and attention. They are, therefore, in the right condition to please the buyer's eye. When these buyers, moreover, as has been the case at this and previous spring shows, are wealthy Americans on the lookout for something good, the prices the seller receives are proportionately higher than usual. Several horses were sold this year to go to the other side of the line at prices quite satisfactory to the sellers, and the same was the case last year.

Besides the sales made at the show the horse trade was further benefited by purchases made previously by those who wished to have something good to exhibit at the show. A number of horses were this year bought on this account that might probably otherwise have been still in their former owners' hands.

The educational value of the show must also be considered. There is a great field almost untouched in instructing the farmers of Canada in the proper methods of breeding such horses as will not only be a credit to the country, but also a source of revenue to themselves. A great deal can be learnt at the spring show, much more than at one of the fall exhibitions, for the reason that the former is a horse show pure and simple, while at the latter there is so much to be seen that the visitor hurries from one stable to another without taking time to thoroughly digest one thing. At the Canadian Horse Show this year there were several farmers from places at some distance from Toronto to whom the show was a veritable eye-opener and these men learnt much during the time of their visit.

For these and other sufficient reasons it will be seen that the money granted by the Ontario Government and the various Horse Associations to the Canadian Horse Show is money well spent, and there is no better use to which it can be put. Great Britain can take from us a number of good horses every year. We should use every effort to retain our hold on her markets by breeding only the best.

PRIZE LIST.

Following is a list of the prizes awarded in the different classes at the Third Annual Canadian Horse Show, held in the Armouries, Toronto, on April 29th to 30th, and May 1st, 1897, under the joint management of the Canadian Horse Breeders' Association and the County and Hunt Club of Toronto.

THOROUGHBREDS.

STALLIONS FOALED PREVIOUS TO JANUARY 1ST, 1894.

JUDGES:—T. C. Patteson, Toronto; R. Gibson, Delaware.

1st. Strathclyde, chestnut, foaled in 1889. Exhibited by George Hendrie, Hamilton, Ont.; sire, Strathmore; dam, Bridal.

2nd. Lee Christy, bay, foaled in 1886. Bred by Frank Harper, Kentucky. Exhibited by Thoroughbred Horse Association, Bradford, Ont.; sire, Longfellow; dam, Little Fanny, by Endorser.

3rd. Montana (imp.), chestnut; white star on forehead, foaled in 1886. Exhibited by Graham Bros., Claremont, Ont.; sire, Muncaster; dam, Zingara, by Albert Victor.

4th. Woodcraft, bay, foaled in 1883. Exhibited by Hurd & Barbour, Toronto, Ont.; sire, Fellowcraft,; dam, Tolona.

STALLIONS FOALED SUBSEQUENT TO OR ON JANUARY 1ST, 1894.

1st. Terremont, bay, foaled in 1894, small star, both hind feet white. Bred and exhibited by A. Frank & Sons, The Grange, Ont.; sire, Dandie Dinmont; dam, Jennie Lind, by Terror.

STALLIONS QUALIFIED TO IMPROVE THE BREED OF SADDLE HORSES AND HUNTERS.

1st. Godard, chestnut, foaled in 1885. Bred by Chinn & Morgan, Lexington, Kentucky. Exhibited by Graham Bros., Claremont, Ont.; sire, King Ban (imp.); dam, Ella Breckenridge.

2nd. Wyndham, dark bay; aged. Exhibited by S. B. Fuller, Woodstock, Ont.; sire, Warwick; dam, Corrilla, by Mortimer (imp.)

3rd. Sleight of Hand, ch.; foaled in 1892. Exhibited by D. L. McCarthy, Toronto; sire, Uncas; dam, Necromancy.

4th. Billetto, bay, foaled in 1884. Exhibited by W. Barbour, 188 Strachan ave., Toronto; sire, Billet (imp.); dam, Calomel, by Canwell (imp.)

FILLY OR GELDING BRED AND OWNED BY EXHIBITOR, NOT THOROUGHBRED, FOALED ON OR SUBSEQUENT TO JANUARY 1ST, 1894. SIRED BY A THOROUGHBRED STALLION AND TO BE SHOWN ON LINE.

1st. Jim W., bay g. Exhibited by G. Ward, Woodhill, Ont.; sire, Dennison.

2nd. Norwich, bay g., foaled in 1894. Exhibited by Thomas Abrahams, Norwich, Ont.; sire, Wyndham; dam by Whistle Jacket.

3rd. Flossie, brown m., foaled in 1894. Exhibited by D. B. Simpson, Bowmanville, Ont.; sire, Wiley Buckles.

4th. Cricket, brown m., foaled in 1895. Exhibited by John Torrance, Thistletown, Ont.; sire, Batsman.

CARRIAGE OR COACH HORSES.

STALLIONS FOALED PREVIOUS TO JANUARY 1ST, 1894; NOT LESS THAN 16 HANDS IN HEIGHT.

JUDGES:—Richard Gibson, Delaware; John Hendrie, Hamilton.

1st. Graf Bremer (German), brown, foaled in 1889. Exhibited by Jas. McCartney, Thamesford, Ont.

2nd. Ludwig (German) 1492), bay, foaled in 1889. Bred by D. Gruhe. Germany. Exhibited by George Cockburn, Baltimore, Ont.; sire, August (1140); dam, Minna (1481).

STALLIONS FOALED SUBSEQUENT TO OR ON JANUARY 1ST, 1894; NOT LESS THAN 16 HANDS IN HEIGHT.

1st. Rainbow, chestnut, foaled in 1894. Exhibited by J. L. Reid, Derry West, Ont.; sire, Regent: dam Hyacintha.

2nd. Pilot Chief, brown, foaled in 1895. Exhibited by Wm. Galbraith, Brampton, Ont.; sire, Jubilee Chief; dam, Lucy Jane, by Little Billie.

STANDARD BRED ROADSTERS.

STALLIONS FOALED PREVIOUS TO JANUARY 1ST, 1894.

JUDGES:—H. Ten Eyck, V.S., Hamilton; S. S. Spaulding, Buffalo.

1st. Bryson (19991). brown, foaled in 1889. Exhibited by Hugh Scott, Caledonia, Ont.; sire, Simmons; dam, Lena, by Clark's Chief.

2nd. Ambrosial (12146), bay, foaled in 1889. Exhibited by John M. Morgan, Ottawa, Ont.

3rd. Uncle Bob (23785), brown, foaled in 1893. Exhibited by Hugh Smith, Claude, Ont.; sire, Wild brino; dam, Brownie, by General Brock.

4th. Leotard (7842), bay, foaled in 1886. Exhibited by Willoughby Cowper, Dundas, Ont.; sire, Walsingham (2166); dam, Ladoga, by Mambrino Patchen (58).

STALLIONS FOALED SUBSEQUENT TO OR ON JANUARY 1ST, 1894.

1st. Charity Bell (28397), brown, foaled in 1894. Bred by McFarran & Clancy, Crescent Hill, Kentucky. Exhibited by A. N. Smeall, Dufferin Park, Toronto; sire, Liberty Bell (13201); dam, Loi, by Combat (1038).

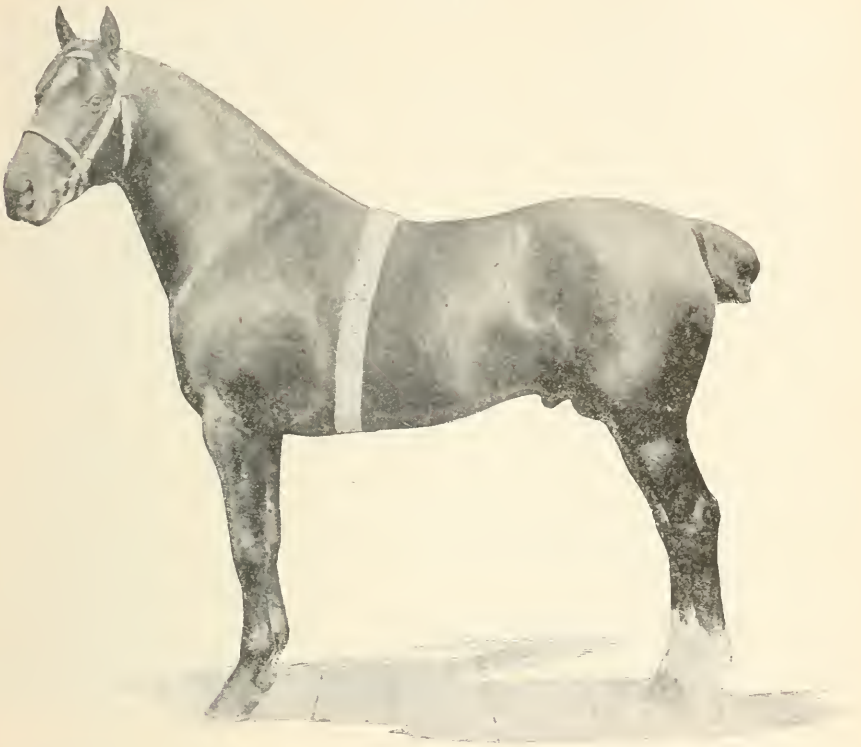
2nd. Lord Veluo (28911), black, foaled in 1895. Exhibited by S. A. MacKay, Shawville, Que.; sire, Geneva (8345); dam, Velveteen, by Glencoe Golddust (5823).

SWEEPSTAKES, STANDARD BRED STALLION, ANY AGE.

Given by the Toronto Electoral District Agricultural Society.

Bryson (19991). Exhibitor, H. Scott, Caledonia.

HACKNEYS.



"ROYAL STANDARD" (IMP.), —55—, (3918), SWEEPSTAKES, HACKNEY STALLION, CANADIAN HORSE SHOW, 1897.

The property of Graham Bros., Claremont, Ont.

STALLIONS FOALED PREVIOUS TO JANUARY 1ST, 1894, OVER 15 HANDS, 2 INCHES.

JUDGES:—Richard Gibson, Delaware; John Hendrie, Hamilton.

1st. Royal Standard (imp.)—55—(3918), bay, white hind feet, 15.3½, foaled in 1890. Bred by B. H. Lane, Limavady, Ireland; imported in 1895, and exhibited by Graham Bros., Claremont; sire, Excelsor (198); dam, Royal Lady (imp.) (379).

2nd. Courier (imp.)—26—(1751), bay, 16; foaled in 1887. Bred by C. E. Cooke, Litcham, Norfolk, Eng.; imported in July, 1890, by Dr. W. Seward Webb, Shelbourne, Vt., U.S. Exhibited by Logie Farm, Mt. Albion, Ont.; sire, Canvasser (114); dam, May Day (479).

3rd. Rosseau Performer (imp.)—34—chestnut roan, foaled in 1893. Bred by John T. Browne, Doncaster, Yorkshire, Eng.; imported in 1894. Exhibited by H. N. Crossley, Rosseau, Ont.; sire, Enthorpe Performer (2973); dam, Fanny (111).

4th. Fireworks (imp.)—16—(6302); brown, 15.3¼, foaled in 1890. Bred by James Scott, Clay Field, Pocklington, Yorkshire, Eng.; imported in 1893. Exhibited by H. N. Crossley, Rosseau, Ont.; sire, Wildfire (1224); dam. Pretty Polly (4574).

STALLIONS, FOALED PREVIOUS TO JANUARY 1ST, 1894, NOT EXCEEDING 15 HANDS 2 INCHES.

1st. Barthorpe Performer (imp.)—52—(5097), dark chestnut, with star, foaled in 1893. Bred by Thomas Jennings, Yorkshire, Eng.; imported and exhibited by The Hillhurst Farm, Hillhurst, Que.; sire Duke of Connaught (3009); dam, Princess (3208).

2nd. Banquo—3—dark bay, star on face, four white feet; foaled in 1892. Bred and exhibited by Robert Beith, Bowmanville, Ont.; sire, Jubilee Chief (imp.)—1—(2122); dam, Mona's Queen (imp.)—4—(5887).

HACKNEY STALLIONS, FOALED IN 1894.

1st. Danish Duke—53—bay, snip on nose, hind ankles white, foaled in 1894. Bred and exhibited by The Hillhurst Farm, Hillhurst, Que.; sire, Fordham (imp.)—36—(287); dam, Princess Dagmar (4590).

STALLIONS, FOALED SUBSEQUENT TO AND ON JANUARY 1ST, 1895.

1st. Hillhurst Sensation—58—bay, little white on off hind heel, foaled in 1895. Bred and exhibited by the Hillhurst Farm, Hillhurst, Que.; sire, Hayton Shales (imp.) —22—(4806); dam, Miss Baker (imp.) —16—(4371), by Ruby (1342).

2nd. Lorenzo—57—brown, star on forehead, foaled in 1896. Bred and exhibited by R. Beith, Bowmanville, Ont.; sire, Banquo—3—; dam, Lady Aberdeen (imp.)—5—(5482).

MARES, FOALED SUBSEQUENT TO AND ON JANUARY 1ST, 1894.

1st. Portia—41—chestnut, with star, foaled in 1895. Bred and exhibited by Robert Beith, Bowmanville, Ont.; sire, Ottawa (imp.)—2—(4440); dam, Florence (imp.)—3—(661).

2nd. Victoria—46—chestnut, blaze on face, white front feet, foaled in 1895. Bred and exhibited by H. N. Crossley, Rosseau, Ont.; sire, Fireworks (imp.)—16—(3602); dam, Lady Cocking (imp.)—11—(5530).

3rd. Lady Isobel—72—bay, foaled in 1895. Bred and exhibited by The Hillhurst Farm, Hillhurst, Que. sire, Hayton Shales (imp.)—22—(4806)—18—(6457); dam, Cameo, by Danegelt (174).

4th. Millington Maid—73—bay, foaled in 1895. Bred and exhibited by the Hillhurst Farm, Hillhurst, Que.; sire, Hayton Shales (imp.)—22—(4806); dam, Vina (imp.)—57—(4853) by Wildfire (1224).

STALLION AND THREE OF HIS GET. STALLION TO COUNT 30 PER CENT. 3 COLTS 70 PER CENT.

1st. Courier (imp.)—26—(1751). Exhibitor, Logie Farm, Mt. Albion, Ont.

2nd. Fireworks (imp.)—16—(6302). Exhibitor, H. N. Crossley, Rosseau, Ont.

HIGH STEPPER, MARE OR GELDING, NOT UNDER 15 HANDS; CONFORMATION AND STYLE OF GOING, AS WELL AS HIGH ACTION, TO BE CONSIDERED; TO BE SHOWN BEFORE A SUITABLE CONVEYANCE, AND SIRED BY A REGISTERED HACKNEY STALLION.

1st. Althorpe Duchess (imp.)—21—(6358); bay, four black legs, foaled in 1892. Bred by John T. Brown, Doncaster, Yorkshire, Eng., imported in 1894. Exhibited by H. N. Crossley, Rosseau, Ont.; sire, Caxton (2398); dam, Bird in Hand (1018); by Pride (1324), etc.

2nd. Jessica—25—brown, star on forehead, four white feet, foaled in April, 1894. Bred and exhibited by Robert Beith, Bowmanville, Ont.; sire, Jubilee Chief (imp.)—1—(2122); dam, Mona's Queen (imp.) —4—(5887).

3rd. Randolph, bay g., 15.2, 4 years. Exhibitor, T. A. Crow, Toronto; sire, Lord Bardolph.

4th. Lady Aberdeen (imp. in dam)—5—(5482); brown, foaled in 1890. Bred by Wm. Martin, Scoreby Grange, Yorkshire, Eng., imported in dam by Robt. Kerr, Raeburn, Man. Exhibited by R. Beith, Bowmanville; sire, Lord Derwent II. (1034); dam, Florence (imp.)—3—(661).

SWEEPSTAKES, BEST HACKNEY, ANY AGE, GIVEN BY THE HACKNEY HORSE SOCIETY.

1st. Royal Standard—55.—Exhibitors, Graham Bros., Claremont, Ont.

SWEEPSTAKES, BEST HACKNEY MARE, ANY AGE, GIVEN BY THE HACKNEY HORSE SOCIETY.

1st. Jessica—25.—Exhibitor, Robt. Beith, Bowmanville, Ont.

SWEEPSTAKES, SADDLE HORSE SIRED BY REGISTERED HACKNEY STALLION, GIVEN BY HACKNEY HORSE SOCIETY, $50.

1st. Jubilee Prince, blk. g., 15.3½, 5 years. Exhibitor, T. A. Crow, Toronto; sire, Jubilee Chief.

2nd. Diamond Jubilee. Exhibited by F. Doane, Toronto; sire, Jubilee Chief.

3rd. Lady Cocking—11. Exhibited by H. N. Crossley, Rosseau, Ont.

SWEEPSTAKES, BEST HACKNEY MARE OR FILLY, BY AN IMPORTED SIRE AND OUT OF AN IMPORTED DAM, BOTH REGISTERED IN THE ENGLISH HACKNEY STUD BOOK, GIVEN BY HACKNEY HORSE SOCIETY OF GREAT BRITAIN, SILVER MEDAL.

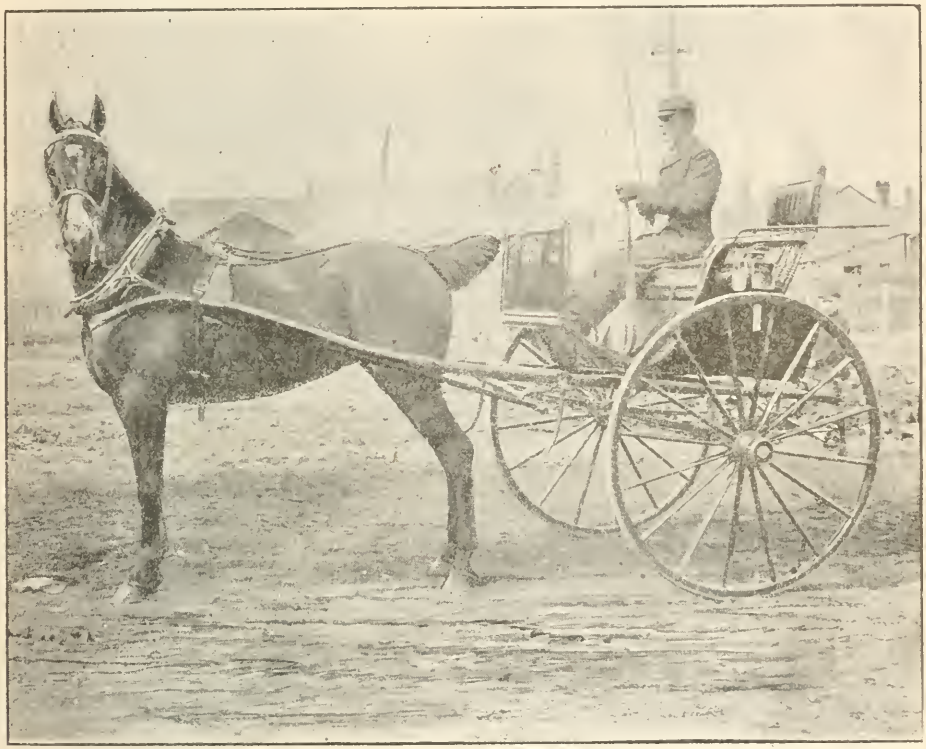
1st. Jessica—25. Exhibitor, Robt. Beith, Bowmanville, Ont.

Reserve. Portia—41. Exhibitor, Robt. Beith, Bowmanville, Ont.

Sweepstakes, best Hackney Stallion or Entire Colt, by an Imported Sire out of an Imported Dam, both Registered in the Hackney Stud Book, given by Hackney Horse Society of Great Britain, Silver Medal.

1st. Banquo—3. Exhibitor, Robt. Beith, Bowmanville, Ont.

Reserve. Hillhurst Sensation—58. Exhibitor, The Hillhurst Farm, Hillhurst, Ont.



"Althorpe Duchess" (imp.), —21—, (6358), 1st Prize High Stepper, Canadian Horse Show, 1897. The property of H. N. Crossley, Rosseau, Ont.

SHIRES.

Stallions, Foaled Previous to January 1st, 1894.

Judges:—Robt. Beith, M.P., Bowmanville; Jas. Torrance, Markham.

1st. Duke of Blagdon (imp.) [257] bay, dark points, foaled August, 1892. Bred by Clement Keevil, New Malden, England. Imported and exhibited by J. M. Gardhouse, Highfield, Ont.; sire, Blagdon Lincoln (12797), dam, Blagdon Brunette, by Lincolnshire Lad.

2nd. Darnley (imp.) [183] (3585), brown, foaled in 1882. Bred by Thos. Johnston, Peterborough, Eng. Imported and exhibited by George Garbutt, Thistletown, Ont.; sire, Champion (450); dam by Thumper (2137).

Mare, any Age.

1st. Rosseau Maid [102] light bay, off hind leg white to hock, other points black, foaled in 1895. Bred and exhibited by H. N. Crossley, Rosseau, Ont.; sire, Bravo II. (imp.) [250] (12835); dam, Queen of Althorpe (imp.) [10].

2nd. Midnight alias Bess of Winona [107], black, foaled 1885. Bred by Geo. F. Lewis, Winona, Ont. Exhibited by Wm. Hendrie, Hamilton, Ont.; sire, Duke of Lancaster (2566); dam, Countess Blyth, by Duke of Wellington (2324).

CLYDESDALES.

Stallions, Foaled Previous to January 1st, 1894.

Judges:—Robt. Beith, M.P., Bowmanville; James Torrance, Markham.

1st. Prince of Quality [2173] (5648), black, ratch on face, hind legs white, foaled March, 1889. Bred by Robert Halloway, Alexis, Ill., U.S. Exhibited by Robert Davies, Toronto; sire, Cedric (imp.), 929, (1087); dam, Jeanie Roy (imp,) [2245].

2nd. Str'aven Callant (imp.)—808—(6326), brown, stripe on face, white hind legs; foaled in 1885. Bred by Andrew Leiper, Yardbent, Strathaven, Scotland. Exhibited by Graham Bros., Claremont, Ont.

3rd. King of Ardnacross (imp.) (8723), brown, white stripe on face, hind legs white, little white on near fore pastern, foaled in 1889. Bred by Mrs. M'Conechy, Ardnacross, Campbeltown, Scotland. Imported and exhibited by Neil Smith, Brampton, Ont.; sire, Duke King (5723); dam, Maggie of Ardnacross (3858).

4th. Merry Monarch [2027], dark bay, stripe on face, two hind feet white, foaled in 1891. Bred by Joseph H. Millard, Altona, Ont. Exhibited by Graham Bros., Claremont; sire, Macneilage (imp.) [1117], (2992); dam, Blossom (imp. in dam) [361], by Lord Lyon (489).

Clydesdale Stallions, Foaled in 1894.

1st. "Young Macqueen," [2290], bay, 4 white feet, and stripe on face; foaled in 1894. Bred by R. B. Ogilvie, Madison, Wis.; exhibited by Graham Bros, Claremont, Ont.; sire, Macqueen (imp.) [462] (5200); dam, Belle of the Lyons (imp.) (3511), by Lord Lyons (855).

2nd. "King's Own," [2172], brown, off hind foot white; foaled May, 1894. Bred and exhibited by Robert Davies, Toronto; sire, Queen's Own (imp.) [1708] (7176); dam Candour (imp) [1656].

3rd. "Macqueen," [2218], dark bay, ratch on face, hind heels white, foaled in 1894. Bred and exhibited by Alex. Doherty, Ellesmere; sire, Queen's Own (imp.) [1708] (7176); dam, Miss Fleming [1919].

Stallions foaled in 1895.

1st. "Goldfinder II.," [2289], brown, face and hind legs white; foaled in 1895. Bred by Wm. Kerr, Houdston, Scotland; imported by Innes & Horton, Clinton, Ont.; owned by Peter Crawford, Dargavel, Dumfries; exhibited by James Henderson, Belton, Ont.; sire, Goldfinder (6807); dam, Stylish Lady, by Eastfield Style (6724).

2nd. "Black Prince," [2240], black; foaled in 1895. Bred and exhibited by Robert Davies, Toronto; sire, Queen's Own (imp.) [1708] (7176); dam, Candour (imp.) [1656], by Macgregor (1487).

Stallions, Foaled Subsequent to and on January 1st, 1896.

1st. "Prince of Blantyre," [2239], bay, white blaze on face, hind heels white; foaled in 1896. Bred and exhibited by Alex. Doherty, Ellesmere, Ont.; sire, Prince of Quality (imp.) [2173] (5648); dam, Miss Fleming (imp.) [1919], by Master of Blantyre (2283).

CANADIAN BRED CLYDESDALES.

A Canadian bred horse is defined by the Clydesdale Association for exhibition purposes as a horse that does not trace on the side of its dam to an imported mare, and has been foaled in Canada.

Stallions Foaled Previous to January 1st, 1895.

1st. "Captain Willie," [2170], bay, stripe on face, little white on feet; foaled May, 1892. Bred by Alsop Bros., Glasgow, Ont.; exhibited by Graham Bros., Claremont, Ont.; sire, Lord Lieutenant (imp.) [975] (4529); dam, Jessie Annam [2133].

2nd. "Bay Wattie," [2288], bay, white stripe, off front and both hind feet white; foaled in 1894. Bred and exhibited by William J. Howard, Dollar, Ont; sire, Red Wattie (imp.) [2287] (8183); dam, Doll Burns [1510], by Prince Imperial (imp.) [74] (1262).

3rd. "Addison," [2158], bay, stripe on face, inside of fore foot white; foaled July 26, 1892. Bred and exhibited by Wm. Foster & Son, Humber, Ont.; sire, Macneilage (imp.) [1117] (2992); dam, Lill [2171], by Prince of Kilblain (imp.) [533] (5268).

Mares, Imported or Canadian Bred, any Age.

1st. "Kate Hill 2nd," [1923] 6337, bay, white face, nigh fore leg and off hind leg white; foaled in 1891. Bred by Jas. I. Davidson & Son, Balsam, Ont.; exhibited by Wm. Brewster, McIntyre, Ont.; sire, Lewie Gordon (imp.) [1602] 5530 (7918); dam, Kate Hill (imp.) [215] (4129).

2nd. "Money Down," [2163], bay, stripe on face, hind feet white; foaled May. 1892. Bred and exhibited by J. W. Robinson, St. Mary's, Ont.; sire, Bay Wallace (imp.) [397], 5823 (4840); dam, Darnley Maid (imp.) [1739].

3rd. "Money May, [2162], bay, blaze on face, two hind feet white; foaled May, 1891. Bred and exhibited by J. W. Robinson, St. Mary's, Ont.; sire, Bay Wallace (imp.) [397], 5823, (4840); dam, Darnley Maid (imp.) [1739].

SWEEPSTAKES, DRAUGHT PAIR OF MARES OR GELDINGS SHOWN IN HARNESS, TO BE PURE BRED CLYDESDALES; GIVEN BY THE CLYDESDALE HORSE ASSOCIATION.

1st. "Money May," [2162], bay.
"Money Down," [2163], bay.
Exhibitor, J. W. Robinson, St. Mary's.

2nd. "Jess," [2210], ch. m.
"Jesmine," [2214], bay m.
Exhibitor, W. Hendrie, Hamilton.

SWEEPSTAKES, DRAUGHT TEAM SHOWN IN HARNESS; TEAMS ELIGIBLE FOR CLASS 31 NOT ELIGIBLE FOR THIS; GIVEN BY THE CANADIAN HORSE BREEDERS' ASSOCIATION.

1st. "Rasper," bay g.; foaled in 1892; sire, Self Esteem (imp.) [377], (5344).
"Thumper," bay g.; foaled in 1892; sire, Broomfield Grange.
Exhibitor, W. Hendrie, Hamilton.

2nd. "Douglas," bay g.; foaled in 1889; sire, McFayden (imp.) [894] (4562).
"Marksman," bay g.; foaled in 1889; sire, Prince Charlie.
Exhibitor, W. Hendrie, Hamilton.

3rd. "Bob," bay g.; sire, Castlemore Bob [1425].
"Mac," bay g.; sire, Macneilage (imp.) [1117] (2992).
Exhibitor, Geo. T. Ward, Woodhill, Ont,

4th. "Blaze," bay m.; sire, Bay Wallace (imp.) [397].
"Gip," brown m.; sire, Bay Wallace (imp.) [397].
Exhibitor, J. W. Robinson, St. Mary's, Ont.

SWEEPSTAKES, BY INDUSTRIAL EXHIBITION ASSOCIATION, FOR BEST CLYDESDALE STALLION OF ANY AGE, EITHER IMPORTED OR CANADIAN BRED.

1st. "Young Macqueen," [2290]. Exhibitors, Graham Bros., Claremont, Ont.

HARNESS, SADDLE, HUNTING AND SPECIAL CLASSES.

HORSES IN HARNESS.

MARE OR GELDING, NOT EXCEEDING 15 HANDS 2 INCHES. TO BE SHOWN TO A GIG, CART OR PHÆTON,

JUDGES—Robt. Graham, Claremont; J. N. Scatcherd, Buffalo, N.Y.; S. S. Spaulding, Buffalo, N.Y.

1st. "Allie Ray," br. M., 15.1½, 5 years. Exhibitor, E. B. Clancy, Toronto.
2nd. "Nightingale," br. m., 15.2, 4 years. Exhibitor, T. A. Crow, Toronto.
3rd. "Miranda," gr. m., 5 years. Exhibitor, R. Beith, Bowmanville.
4th. "Windfall," ch. g., 15.1½, 4 years. Exhibitor, S. B. Fuller, Woodstock.

MARE OR GELDING OVER 15 HANDS 2 INCHES. TO BE SHOWN TO A GIG, DOG CART OR PHÆTON.

JUDGES—R. Graham, Claremont; S. S. Spaulding, Buffalo, N.Y.

st. "Diamond Jubilee," br. g., 16, 5 years. Exhibitor, F. Doane, Toronto.
2nd. "Chief," ch. g., 15.3, 5 years. Exhibitor, Geo. H. Gooderham, Toronto.
3rd. "The President," bay g., 16, 6 years. Exhibitor, Isaac Watson, Toronto.
4th. "Chester," bay g., 16, 5 years. Exhibitor, Toronto Horse Exchange, Toronto.

PAIR OF HORSES NOT EXCEEDING 15 HANDS 2 INCHES. TO BE SHOWN TO A FOUR-WHEELED VEHICLE.

JUDGES—J. N. Scatcherd, Buffalo, N.Y.; R. Graham, Claremont.

1st. "Nightingale, br. m., 15.2, 4 years.
"Randolph," bay g., 15.2, 4 years.
Exhibitor, T. A. Crow, Toronto.

2nd. "Jessica,"—25—br. m., 3 years.
"Lady Aberdeen,"—5—br. m., 7 years.
Exhibitor, R. Beith, Bowmanville.

{"Brandy," bay g., 15.1, 7 years.
"McGinnis," bay g., 15.1, 5 years.
Exhibitor, Adam Beck, London.

4th. {"Stockwood," bay g., 15.2, 5 years.
"Rockwood," bay g., 15.2, 5 years.
Exhibitor, Toronto Horse Exchange.

PAIR OF HORSES OVER 15 HANDS 2 INCHES. TO BE SHOWN TO AN APPROPRIATE FOUR-WHEELED VEHICLE.

JUDGES—R. Graham, Claremont; S. S. Spaulding, Buffalo, N.Y.

*1st. {"Monte Christo," ch. g., 15.3, 5 years.
"St. Elmo," ch. g., 15.3, 6 years.
Exhibitor, S. F. McKinnon, Toronto.

*2nd. {"Chief," ch. m., 15.3.
"Belle," ch. m., 15.3.
Exhibitor, Geo. H. Gooderham, Toronto.

3rd. {"Marengo, gr. g., 15.3½, 5 years.
"Blossom," blk. m., 15.3½, 5 years.
Exhibitor, T. A. Crow, Toronto.

4th. {"Wilfred," bay g., 16, 5 years.
"Sir Charles," bay g., 16, 5 years.
Exhibitor, J. Ross Robertson, M.P., Toronto.

PAIR OF HORSES NOT UNDER 15 HANDS 2 INCHES. TO BE SHOWN BEFORE A BROUGHAM. HORSES TO COUNT 60 PER CENT., BROUGHAM AND GENERAL APPOINTMENTS 40 PER CENT.

JUDGE—R. Graham, Claremont.

1st. Wilfred, bay g., 16, 5 years; Sir Charles, bay g, 16, 5 years. Exhibitor, J. Ross Robertson, M.P., Toronto.

TANDEMS.

HARNESS TANDEM. WHEELER TO BE OVER 15 HANDS.

JUDGES—A. Graham, Claremont; J. N. Scatcherd, Buffalo, N.Y.; S. S. Spaulding, Buffalo, N.Y.

1st. Jessica—25—br. m., 3 years; Lady Aberdeen—5—br. m., 7 years. Exhibitor, R. Beith, Bowmanville.
2nd. Marengo, gr. g., 15.3½, 5 years; Blossom, blk. m., 15.3½, 5 years. Exhibitor, T. A. Crow, Toronto.
3rd. Nightingale, br. m., 15.2, 4 years; Skylark, bay m., 15.3, 5 years. Exhibitor, T. A. Crow, Toronto.

FOUR-IN-HANDS.

ROAD TEAMS NOT UNDER 15 HANDS. MAY BE SHOWN BEFORE A COACH, DRAG OR BRAKE.

JUDGES—Robt. Graham, Claremont; John Hendrie, Hamilton.

1st. Exhibitor, T. A. Crow, Toronto.
2nd. Exhibitor, Toronto Horse Exchange, Toronto.

SADDLE HORSES.

MARE OR GELDING, OVER 14 HANDS 2 INCHES AND NOT EXCEEDING 15 HANDS 2 INCHES.

JUDGES—S. B. Fuller, Woodstock; J. N. Scatcherd, Buffalo, N.Y.; C. E. Mather, Philadelphia, Pa.

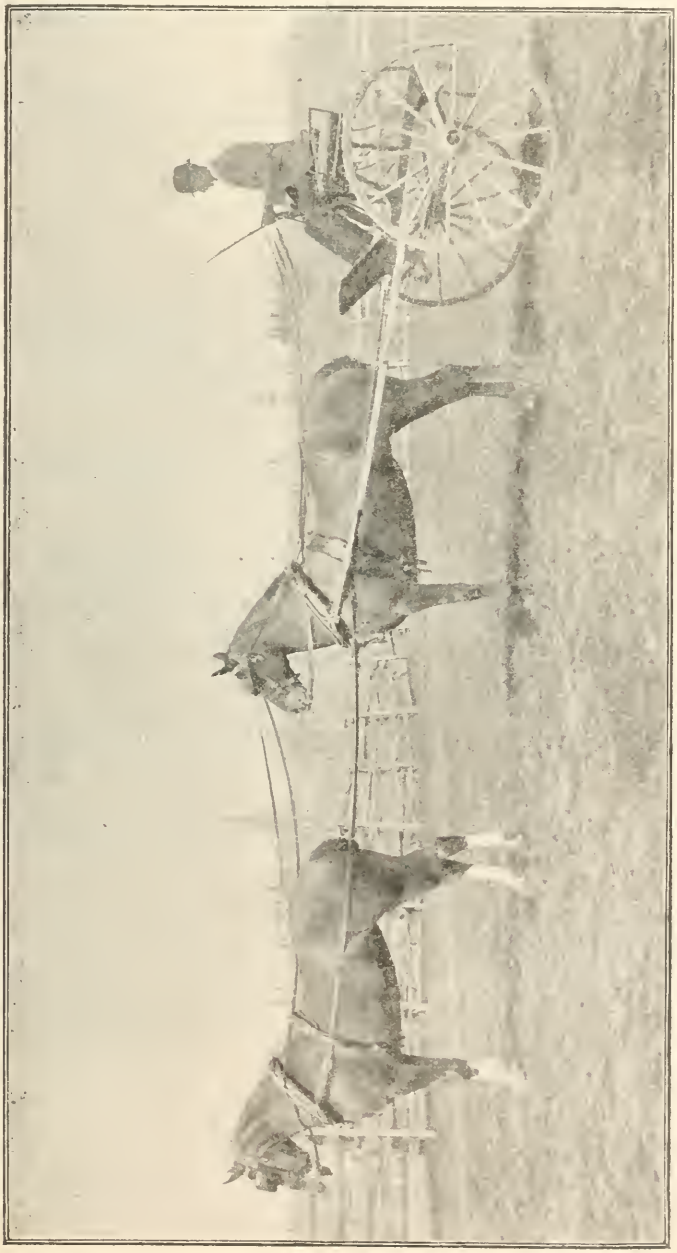
1st. Ulster, br. g., 15.1½, 5 years. Exhibitor, D. Hughes Charles, Galt.
2nd. Valentine, bay g., 15.1½, 6 years. Exhibitor, G. W. Beardmore, Toronto.
3rd. Lady May, ch. m., 15.1, 6 years. Exhibitor, Adam Beck, London.
4th. Sunburn, bay g., 16, 6 years. Exhibitor, F. J. Capon, Toronto.

* Protested.

MARE OR GELDING, OVER 15 HANDS 2 INCHES.

JUDGES—Colin Campbell, Montreal; John Hendrie, Hamilton.

1st. Golden, ch. g., 5 years. Exhibitor, D. King Smith, Toronto.
2nd. Nourmaller, ch. m., 15.3, 5 years. Exhibitor, Adam Beck, London.
3rd. Gold Star, ch. g., 16, 5 years. Exhibitor, G. A. Stimson, Toronto.
4th. My Lady, bay m., 16, 14 years. Exhibitor, Adam Beck, London.



"LADY ABERDEEN" (IMP.), —5—, (5482), AND "JESSICA," —25—, 1ST PRIZE TANDEM TEAM, CANADIAN HORSE SHOW, 1897.
The property of R. Beith, Bowmanville, Ont.

LADY'S SADDLE HORSE, NOT UNDER 14 HANDS 3 INCHES.

JUDGES—J. N. Scatcherd, Buffalo, N.Y.; S. S. Spaulding, Buffalo, N.Y.; C. E. Mather, Philadelphia, Pa.

1st. Dalmeny, bay m., 15.3, 6 years. Exhibitor, John A. Gunn, Toronto.
2nd. Vidette, bay g., 15.2, 6 years. Exhibitor, Geo. A. Peters, Toronto.
3rd. Nora Creina, bay m., 15.3, 6 years. Exhibitor, Mrs. J. K. Kerr, Toronto.
4th. Wild Mark, bay g., 16, 6 years. Exhibitor, W. A. Lawrence, Milton.

BEST SADDLE AND HARNESS HORSE, MARE OR GELDING, 15 HANDS AND OVER TO BE SHOWN FIRST IN HARNESS, THEN UNDER SADDLE IN SAME CLASS. QUALITY AND MANNERS TO BE SPECIALLY CONSIDERED.

JUDGES—J. N. Scatcherd, Buffalo, N.Y.; S. B. Fuller, Woodstock; R. Graham, Claremont.

1st. Nourmaller, ch. m., 15.3, 5 years. Exhibitor, Adam Beck, London.
2nd. Rufus, ch. g., 6 years. Exhibitor, Hume Blake, Toronto.
3rd. Dalmeny, bay m., 15.3, 6 years. Exhibitor, John A. Gunn, Toronto.

HUNTERS AND JUMPERS.

A horse to be eligible for the qualified hunters' classes must have been regularly hunted with a recognized pack of hounds for more than one season, and within a year from date of entry, or have won a first or second prize at a recognized Horse Show or Exhibition. For the purposes of this show a Green Hunter is one which has not been hunted more than one season, and has never won a first or second prize at a recognized Horse Show or Exhibition. Certificates required if necessary.

QUALIFIED HUNTERS (HEAVYWEIGHT), UP TO CARRYING 180 LBS. CONFORMATION AND QUALITY TO COUNT 60 PER CENT., PERFORMANCES OVER FENCES TO COUNT 40 PER CENT. A HORSE TAKING A PRIZE IN THIS CLASS INELIGIBLE FOR LIGHTWEIGHT CLASS. TO CARRY AT LEAST 168 LBS.

JUDGES—J. N. Scatcherd, Buffalo, N.Y.; S. B. Fuller, Woodstock.

1st. Huntsman, ch. g., 16.2, 5 years. Exhibitor, Adam Beck, London.
2nd. The Maid, bay m., 16.2, 7 years. Exhibitor, J. Phillips, Toronto.
3rd. Cockatoo, br. g., 16, aged. Exhibitor, G. W. Beardmore, Toronto.
4th. Golden, ch. g., 16.1, 5 years. Exhibitor, D. King Smith, Toronto.

QUALIFIED HUNTERS (LIGHTWEIGHT), UP TO CARRYING 150 LBS. TO HOUNDS. CONFORMATION AND QUALITY TO COUNT 60 PER CENT., PERFORMANCES OVER FENCES TO COUNT 40 PER CENT. TO CARRY AT LEAST 140 LBS.

JUDGES—S. B. Fuller, Woodstock; C. E. Mather, Philadelphia, Pa.; J. N. Scatcherd, Buffalo, N.Y.

1st. Sir James, gr. g., aged. Exhibitor, D. King Smith, Toronto.
2nd. Misbehaviour, bay m., 15.1, 4 years. Exhibitor, Royal City Stables, Guelph.
3rd. Jack, blk. g. Exhibitor, G. W. Beardmore, Toronto.
4th. Blaze, bay g., 15.3½, 7 years. Capt. S. Denison, Toronto.

GREEN HUNTERS (HEAVYWEIGHT) UP TO CARRYING 180 LBS. TO HOUNDS. CONFORMATION AND QUALITY TO COUNT 60 PER CENT., PERFORMANCES OVER FENCES 40 PER CENT. A HORSE TAKING A PRIZE IN THIS CLASS INELIGIBLE FOR LIGHTWEIGHT CLASS. TO CARRY AT LEAST 168 LBS.

JUDGES—C. E. Mather, Philadelphia, Pa.; S. B. Fuller, Woodstock.

1st. Lady Roseberry, ch. m., 16, 4 years. Exhibitor, Adam Beck, London.
2nd. My Lady, bay m., 16, 4 years. Exhibitor, Adam Beck, London.
3rd. Rufus, ch. g., 16, 6 years. Exhibitor, Hume Blake, Toronto.
4th. Don, gr. g. Exhibitor, G. W. Beardmore, Toronto.

GREEN HUNTERS (LIGHTWEIGHT), UP TO CARRYING 150 LBS. TO HOUNDS. CONFORMATION AND QUALITY TO COUNT 60 PER CENT., PERFORMANCES OVER FENCES TO COUNT 40 PER CENT. TO CARRY AT LEAST 140 LBS.

JUDGES—S. B. Fuller, Woodstock; J. N. Scatcherd, Buffalo, N. Y.

1st. Student, br. m., 16.1, 5 years. Exhibitor, Royal City Stables, Guelph.
2nd. Viking, ch. g., 15.3, 5 years. Exhibitor, Geo. A. Peters, Toronto.
3rd. Melrose, bay g., 15.3, 5 years. Exhibitor, Adam Beck, London.
4th. Rifle Boy, bl. g., 16, 6 years. Exhibitor, J. Phillips, Toronto.

FOR THE BEST PERFORMANCE OVER SIX JUMPS, 2 AT 4 FT., 2 AT 4 FT. 6 IN., 2 AT 5 FT., CARRYING NOT LESS THAN 140 LBS.

JUDGES—S. B. Fuller, Woodstock; J. N. Scatcherd, Buffalo, N.Y.

1st. Huntsman, ch. g., 16.2, 5 years. Exhibitor Adam Beck, London

CORINTHIAN CLASS. OPEN TO HUNTERS.

Horses must be ridden by members of some recognized Hunt. Conformation and quality to count 25 per cent., performance over fences to count 75 per cent.

JUDGES—S. B. Fuller, Woodstock; Colin Campbell, Montreal.

1st. Huntsman, ch. g., 16.2, 5 years. Exhibitor, Adam Beck, London.
2nd. Sir James, gr. g., 16, aged. Exhibitor, D. King Smith, Toronto.

ROADSTERS. (*Standard or Non-Standard.*)

A roadster, when mature for driving, should not be under 15 hands high. Conformation, style of going, manners, hock and knee action, whether driven with ordinary or heavy shoes to force action, and as the horses are and appear at the time of showing in the ring, will be considered in judging. To be shown in harness to a road wagon.

MARE OR GELDING.

JUDGES—H. Ten Eck, Hamilton, Ont.; S. S. Spaulding, Buffalo, N.Y.

1st. Blue Bells, roan mare, 15.2, 5 years. Exhibitor, J. J. Burns, Toronto.
2nd. Lillie Sprague, bay m., 15.2½, 6 yrs. Exhibitor, P. Irving, Woodstock.
3rd. Prince Hal, gr. g., 15.1, 6 yrs. Exhibitor, A. W. Holman, Toronto.
4th. Goldwinner, 15.2½, 5 yrs. Record, 2.27¼. Exhibitor, A. N. Smeall, Dufferin Park, Toronto.

PAIR OF MARES OR GELDINGS.

1st. Paul, bay g., 15.3, 5 yrs.; Kate, bay m., 15.3, 6 yrs. Exhibitor, Thos. Oliphant, Clarkson.
2nd. Confidence, bay mare, 5 yrs.; Rover, bay g., 5 yr. Exhibitor, T. A. Crow, Toronto.
3rd. Prince, ch. g., 15.2, 6 yrs.; Duchess, ch. mare, 15.2, 7 yrs. Exhibitor, Dent Dalton, Delhi

PONIES.

PONY IN HARNESS 14 HANDS AND UNDER.

JUDGES—Robert Graham, Claremont; S. S. Spaulding, Buffalo, N.Y.

1st. Greta, bay mare, 3 yrs. Exhibitor, Robert Beith, Bowmanville.
2nd. Vixen, gr. m., 12.1, 4 yrs. Exhibitor, Robt. Miller, Brougham.
3rd. Dolly, ch. m., 8 yrs. Exhibitor, S. Nordheimer, Toronto.

JUMPING CLASS.

Ponies 14 hands and under ridden by boys not over 14 years of age. Boys employed in or about stables excluded. Performances over fences only to count.

1st. Creta, blk. g., 5 yrs. Exhibitor, Robert Davies, Toronto.
2nd. Fritz, blk. s. Exhibitor, Judson Jenkins, Toronto.

POLO PONIES. NOT OVER 14 HANDS 2 INCHES.

To be shown under saddle and over jumps. Quality and manners to count 50 per cent., jumping 50 per cent. To carry 154 lbs. at least.

JUDGES—S. B. Fuller, Woodstock ; J. N. Scatcherd, Buffalo, N.Y.

1st. Daisy, gr. m., 14.1¾, 5 yrs. Exhibitor, Major Lessard, Stanley Barracks, Toronto.
2nd. Duty, bay m., 14.1½, 6 yrs. Exhibitor, Capt. Forester, Stanley Barracks, Toronto.

SPECIAL CLASSES.

BEST AND BEST APPOINTED PAIR OF HORSES TO CAB AS LET FOR HIRE.

To be bona fide property of owner one month before date of show. Horses to count 60 per cent , cab and appointments 40 per cent.

JUDGES—S. N. Scatcherd, Buffalo, N.Y.; S. S. Spaulding, Buffalo, N.Y.

1st. F. Doane, 621 Yonge st.
2nd. P. Maher, 19 Bloor st.

MARE OR GELDING, TO BE SHOWN IN SINGLE HARNESS AND DELIVERY WAGON, ACTUALLY AS USED IN LOCAL DELIVERIES.

Horse to count 50 per cent., wagon and equipment 50 per cent. Horse to have been owned and actually used in delivery by exhibitor two months before date of exhibition.

JUDGES—R. Beith, Bowmanville ; R. Graham, Claremont ; Jas. Torrance, Markham.

1st. Black Bess, blk. m., 16.3, 8 yrs. Exhibitor, Harry Webb Co. (Ltd.), Toronto.
2nd. Nellie, gr. m., 15, 6 yr. Exhibitor, Thos. Bartrem, 517 Yonge st., Toronto.

BEST PERFORMANCE OF PROFESSIONAL PRIVATE COACHMAN IN LIVERY, WITH PAIR AND CARRIAGE TO LANDEAU, BROUGHAM OR HEAVY VICTORIA.

JUDGE—J. N. Scatcherd, Buffalo, N.Y.

1st. Walter Rudd, Coachman for A. E. Gooderham, Toronto.
2nd. John Milligan, Coachman for W. B. Simpson, Toronto.
3rd. James Norton, Coachman for Geo. Gooderham, Toronto.

BEST AMATEUR DRIVING OF PAIR OF HORSES TO FOUR-WHEELED VEHICLE.

JUDGES—R. Graham, Claremont ; J. N. Scatcherd, Buffalo, N.Y.; S. S. Spaulding, Buffalo, N.Y.

1st. Adam Beck, London.
2nd. E. B. Clancy, Toronto.

BEST DRIVING OF TANDEM, OPEN TO MEMBERS OF A RECOGNIZED HUNT OR COUNTRY CLUB.

JUDGE—J. N. Scatcherd, Buffalo, N.Y.

Equal 1st. { Adam Beck, London.
{ G. A. Stinson, Toronto.

BEST RIDING BY GENTLEMAN, OPEN TO MEMBERS OF A RECOGNIZED HUNT OR COUNTRY CLUB.

JUDGES—S. B. Fuller, Woodstock ; Colin Campbell, Montreal.

1st. Geo. A. Carruthers, Toronto.

CATTLE, SHEEP AND SWINE-BREEDERS' CONVENTIONS

The Annual Meeting of the DOMINION CATTLE-BREEDERS' ASSOCIATION will convene in the Drill Hall, Brantford, December 6th, at 7 30 p.m.

From 7.30 to 10 p.m. will be spent in carrying out the following programme :—

1.—Addresses and Reports of Officers.

2.—Reports of Committees.

3.—Nomination of Expert Judges.

4—Election of Delegates to Fair Boards.

5.—Election of Officers and Auditors.

6. Lieut.-Col. McCrae will deliver an address on "Tuberculosis in Domestic Animals" Instructive illustrations will be used.

The Annual Meeting of the DOMINION SHEEP-BREEDERS' ASSOCIATION will convene in the Drill Hall, Brantford, December 8th, at 7.30 p.m.

From 7.30 p.m. to 10 p.m. will be spent in carrying out a programme similar to the above including sections 1 to 5.

6.—After which Mr. Mortimer Levering, Lafayette, Ind., will address the members dealing with the "Requirements of the Home and Foreign Mutton and Wool Markets."

The Annual Meeting of the DOMINION SWINE-BREEDERS' ASSOCIATION will convene in the Drill Hall, Brantford, December 9th, at 7 30 p.m.

From 7.30 p.m. to 10 p.m. will be spent in carrying out a programme similar to the above including sections 1 to 5.

6.—After which Mr. Chester Fearman, Hamilton; Mr. J. W. Flavelle, Toronto, and Mr. C. C. L. Wilson, Ingersoll, will deliver addresses setting forth the "Requirements of the Home and Foreign Pork and Bacon Markets." These addresses will be illustrated.

PUBLIC MEETING

TO BE HELD IN THE OPERA HOUSE, BRANTFORD ONT., AT 7.30 P.M., DECEMBER 7TH, 1897.

Chair taken by HON. A. S. HARDY, Premier of the Province of Ontario.

FOURTEENTH ANNUAL

ONTARIO PROVINCIAL

FAT STOCK AND DAIRY SHOW

TO BE HELD IN THE

CITY OF BRANTFORD

On December 7th, 8th and 9th, 1897.

OVER $4,000 CASH PRIZES

Are offered in the Live Stock and Dairy Departments.

Reduced Rates on all Railroads.

Prize Lists and Entry Forms may be had by applying to

F. W. HODSON.

Secretary Treasurer,

Parliament Buildings, Toronto.

THIRD ANNUAL REPORT

OF THE

FRUIT EXPERIMENT STATIONS

OF

ONTARIO

UNDER THE JOINT CONTROL OF THE

ONTARIO AGRICULTURAL COLLEGE, GUELPH,

AND THE

FRUIT GROWERS' ASSOCIATION OF ONTARIO,

1896.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF THE
LEGISLATIVE ASSEMBLY OF ONTARIO.

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WARWICK BRO'S & RUTTER, Printers, &c., &c., 68 and 70 Front Street West.
1897.

THIRD ANNUAL REPORT

OF THE

ONTARIO FRUIT EXPERIMENT STATIONS

1896.

To the Honorable John Dryden, Minister of Agriculture for Ontario :

SIR,—This report is submitted for your approval, believing you will see in it evidences of considerable progress in the work of testing varieties by our stations. Most of the experimenters already had a considerable collection of fruits on their grounds before undertaking this work for the public good, and are therefore prepared to give useful information from the first, regarding varieties.

Experimental work proper, dealing with the effect of different soils, fertilizers, spraying, etc., upon the yield and vigor of trees and vines, is being also undertaken, but reports of such work must necessarily be the work of years of patient experiment and exact records.

We have the honor to be, Sir,

Your obedient servants,

JAMES MILLS,
Chairman.

L. WOOLVERTON,
Secretary.

BOARD OF CONTROL, 1897.

REPRESENTING THE COLLEGE.

JAMES MILLS, M.A., LL.D, Guelph ..... President
H. L. HUTT, B.S.A., Guelph ..... Horticulturist

REPRESENTING THE FRUIT GROWERS' ASSOCIATION FOR 1897.

A. M. SMITH ..... St. Catharines.
A. H. PETTIT ..... Grimsby.
W. E. WELLINGTON ..... Toronto.
L. WOOLVERTON, M.A., Secretary ..... Grimsby.

EXECUTIVE COMMITTEE

Chairman—JAMES MILLS, M.A., LL.D.
Secretary—L. WOOLVERTON, M.A.
Official Visitor—H. L. HUTT, B.S.A.

THE ONTARIO FRUIT EXPERIMENT STATIONS.

Name.	*Specialty.*	*Experimenter.*
1. Southwestern	Peaches	W. W. HILBORN, Leamington, Ont.
2. Niagara	Tender Fruits	Martin BURRELL, St. Catharines, Ont.
3. Wentworth	Grapes	M. PETTIT, Winona, Ont.
4. Burlington	Blackberries and Currants	A. W. PEART, Freeman, Ont.
5. Lake Huron	Raspberries and Commercial Apples.	A. E. SHERRINGTON, Walkerton, Ont.
6 Georgian Bay	Plums	John G. MITCHELL, Clarksburg, Ont.
7. Simcoe	Hardy apples and hardy cherries	G. C. CASTON, Craighurst, Ont.
8. East Central	Pears and Commercial Apples.	R. L. HUGGARD, Whitby, Ont.
9. Bay of Quinte	Apples	W. H. DEMPSEY, Trenton, Ont.
10. St. Lawrence	Hardy Pears, Hardy Plums.	Harold JONES, Maitland, Ont.
11. Strawberry sub-station		E. B. STEVENSON, Guelph.
12. Gooseberry sub-station		S. SPILLETT, Nantye.
13. Cherry station and General collection of fruits for descriptive work	Cherries	L. WOOLVERTON, Grimsby.

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FRUIT EXPERIMENT STATIONS OF ONTARIO.

FRUITS OF ONTARIO

Described and Illustrated by Mr. L. Woolverton, Secretary of the Ontario Fruit Experiment Stations.

Fruit growing has become so important an industry in the Province of Ontario, that it deserves every encouragement at the hands of the Department of Agriculture. The Canadian farmer who contemplates growing fruit asks for information on two points in particular, viz., (1) What fruits shall I plant, and (2) how shall I cultivate them ? The latter of these questions it is the province of the Ontario Fruit Growers' Association to answer through the Canadian Horticulturist and the Annual Report, while the former question is one that can be solved only by years of patient experimental work by our fruit experiment stations

Of equal importance is some means of identifying all varieties now grown in our Province, and of knowing with some degree of exactness the size, color, general appearance and real value of these varieties aside from the catalogues of the nurserymen. To meet this latter need, the Secretary, with the advice and approval of the Board of Control, has begun the work of illustrating and describing the fruits of Ontario. The illustrations are all new and original, having been engraved from photographs made the exact size of the fruit samples, except where otherwise specified, and in this way there will in time be made access ble to the Ontario fruit growers a complete guide to all the fruits grown in the Province. Such a work necessarily must be slow and tedious, but it is all important that it should be characterized by scientific accuracy, and the writer invites notes or criticism from pomologists generally.

JAMES MILLS, M.A.,
Chairman.

L. WOOLVERTON,
Secretary.

APPLES.

Baldwin. (*Steele's Red Winter*).

The Baldwin originated in the State of Massachusetts and was for many years the most popular winter apple for either home or foreign markets. The average yield each alternate year was about eight barrels per tree, and in some instances much larger. Large orchards of this variety were in consequence planted in the apple growing counties of middle and southern Ontario, but unfortunately for many years now these orchards have been almost barren, and many of them are being dug out as worthless. The cause may be poverty of soil, the lack of pollen of other varieties to fertilize the blossoms, or the prevalence of apple scab. If it is the latter, it may be overcome with the Bordeaux mixture; if lack of potent pollen, by grafting in other varieties here and there through the orchard.

Baldwin.

Tree, upright, spreading, vigorous grower, formerly very productive.

Fruit, large, roundish, ovate; skin yellow, shaded and splashed with crimson and red, dotted with some russet dots; stem heavy, three-quarters of an inch long, in a broad cavity; calyx, closed, in a deep plaited basin.

Flesh, yellowish white, tender, sub-acid; quality, second class.

Season of use, January to March.

Adaptation. Not very hardy at Simcoe station or in North Ontario county; further south and along the borders of the lakes, this apple may be grown to perfection, if the scab can be kept off the trees.

Section of Baldwin.

CABASHEA. (*Twenty Ounce Pippin*).

Not worth planting in Ontario. Through confusing its name with that of the Cayuga Red Streak, often called Twenty Ounce, this apple has been widely planted in our Province. The tree is unproductive and the fruit, though large and fine in appearance, drops early and is poor in quality. Twenty trees, at Maplehurst, twenty years planted, yielded about ten barrels of apples in 1895, the best so far.

SECTION OF CABASHEA.

ORIGIN, unknown.

TREE, vigorous, spreading, unproductive.

FRUIT, large, roundish, oblate, slightly conical; skin, yellowish green, shaded with dull red on the sunny side; stem, an inch long, stout, in a wide cavity of moderate depth; calyx open in a wide shallow basin; core medium.

CABASHEA. (Reduced).

FLESH, white, firm, coarse, sub-acid, only fair for cooking, useless for dessert.

SEASON, October to December. At Bay of Quinte station, season given from December to February.

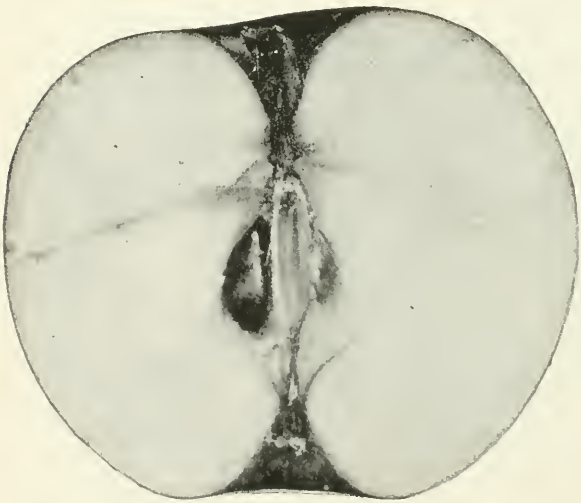
Tested, twenty years at Maplehurst, Grimsby.

Ben Davis.

One of the most popular market apples in the southwestern and western states because of its great productiveness, hardiness, good color and its keeping and shipping qualities. Highly valued in some commercial orchards in Canada, but condemned by some growers on account of its inferior quality.

Ben Davis.

At the World's Fair in 1893, some of the finest apples shown by Iowa, British Columbia and Oregon were the Ben Davis. It is a profitable market apple.



Section of Ben Davis.

Origin, brought from North Carolina to Kentucky with a lot of other seedling apples by Mr. Ben Davis. Scions taken from Kentucky to Southern Illinois about 1820.

Tree, spreading, fairly vigorous and very productive.

Fruit, medium to large, roundish, truncated conical, unequal; color, yellow, striped and splashed with red, having scattered aerole dots; stem, slender, one to one and a half inches long in a deep cavity; calyx, erect, partly closed in a deep, wide basin.

Flesh, white, tender, mild subacid.

Quality, dessert, poor; cooking, fairly good; home market, good; foreign market, very good.

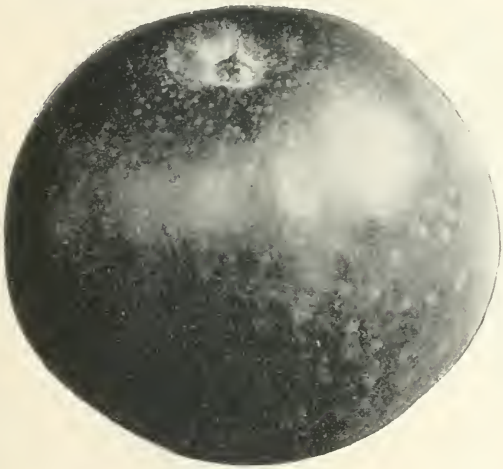
Season, January to May. (Bay of Quinte station.)

Adaptation. Succeeds remarkably well at the Georgian Bay and Bay of Quinte stations.

Canada Red.

(Baltimore of Downing.)

This apple is grown quite widely in Ontario under the name of Canada Red, and is valued as a profitable commercial variety, especially where Baldwin, Spy and Ontario do not succeed; for, although only medium in size, it yields abundantly and the fruit is deeply colored, regular, clean and firm. There is an old variety of this name, which is now little grown, if at all, in Canada and which, though somewhat similar, is inferior to this variety, and consequently is undeserving of description.

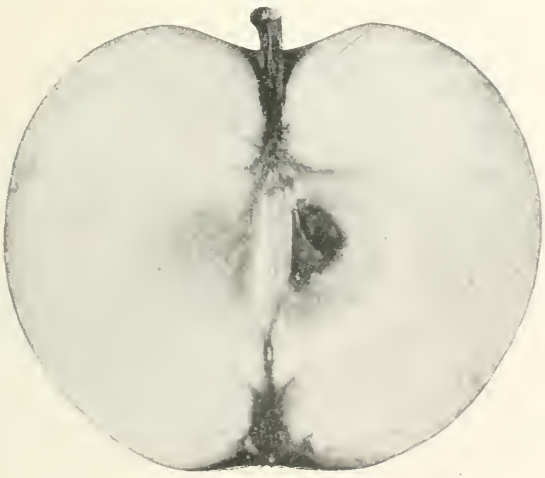


Canada Red.

Origin. Unknown.

Tree. Vigorous, hardy and very productive.

Fruit Medium, roundish, slightly conical, regular; color, greenish yellow, almost covered with red, sometimes splashed or slightly striped with darker red, having numerous large prominent greenish areole dots, which are smaller towards the apex; stem, half an inch long in a small deep and often russeted cavity; calyx small, closed in a shallow slightly corrugated basin.



Section of Canada Red.

Flesh, greenish white, fine grained, firm, moderately juicy; flavor, fair, mild, sub-acid.

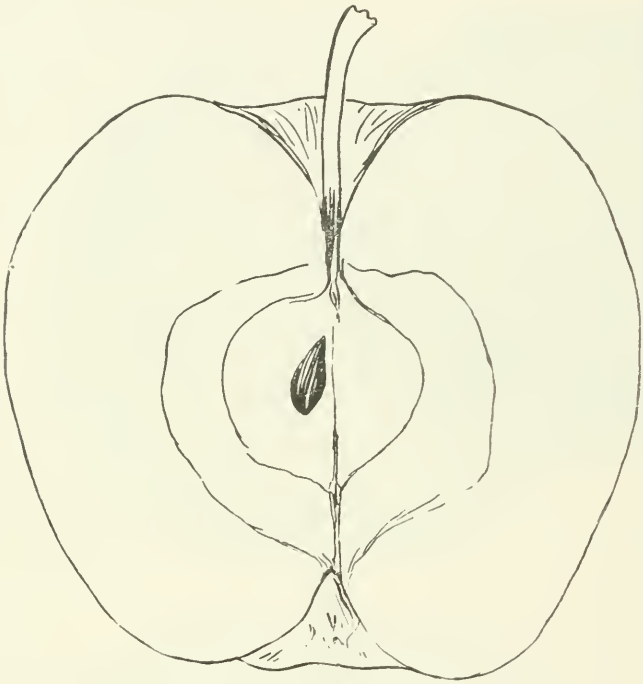
Season, December to May.

Quality, dessert, medium; cooking, medium; home market good; foreign market, very good.

Adaptation. Reported hardy as far north as our St. Lawrence station near Prescott; succeeds at Peterboro' and throughout all middle and southern Ontario.

Cranberry Pippin.

An apple that is worthy of being planted in southern Ontario as a fancy variety for export. Though the quality is ordinary and not suitable for dessert, its extreme beauty when opened in mid-winter, its large and even size, usual freedom from blemishes and the productiveness of the tree every alternate year, make it a desirable variety.



Section of Cranberry Pippin.

At Maplehurst, Grimsby, in 1895, fifty trees of this variety, about twenty years planted, yielded 200 barrels of high grade apples, and in 1893, when other varieties were almost worthless, nearly the same quantity. Sometimes, however, this variety is subject to warts and knots which mar its beauty.

Origin, accidental on a farm, near Hudson River, N.Y.

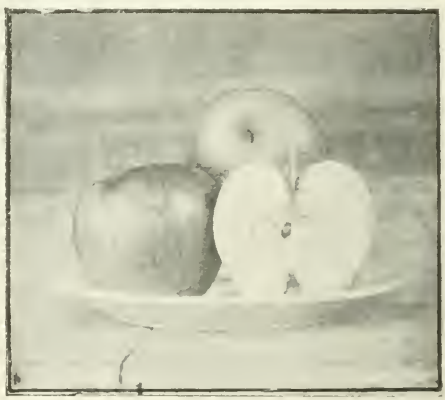
Tree, very vigorous, healthy, spreading, productive.

Fruit, medium to large, roundish oblate; skin, smooth, yellow shaded and striped with two shades of red; stem, slender, one one-eighth inches long in a deep cavity: calyx closed in a wide, wrinkled basin.

Flesh, white, firm, crisp, moderately juicy, sub-acid,

Quality, fair.

Season, November to February.



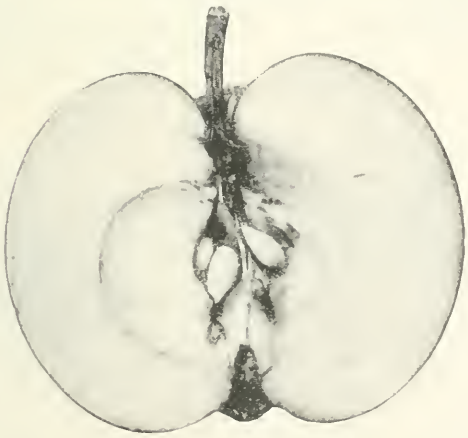
Cranberry Pippin. (Reduced.)

Adaptation. Southern portions of the Province, especially along the shores of the lakes.

Early Harvest.

The best apple of its season both for dessert and cooking, but of late years rendered worthless in Ontario by scab, which not only spoils its appearance but lessens its size and injures its flavor. The Early Harvest and Fall Pippin are the two apples which seem to be least able to resist this terrible fungus, and which most favor its spread. Unless therefore this fungus is checked by spraying with the Bordeaux mixture, this apple must soon be left out of the list of desirable varieties.

Early Harvest.



Section of Early Harvest.

Origin, United States.

Tree, only medium in vigor, never attaining a large size, old trees averaging from one-half to two-thirds the size of Greening trees of the same age; upright and spreading; productive, considering the size of the tree and the fruit; yield of full grown trees averages about four barrels every alternate year.

Fruit, medium round, oblate; skin, smooth, bright straw color when ripe, with a few faint dots; stem, short, one-half to three-quarters of an inch, in a medium cavity, often russeted; calyx closed in a shallow, sometimes slightly plaited basin.

Flesh, white, fine grained, juicy, crisp, tender; flavor, rich, sprightly, pleasant sub-acid.

Season, first week in August; in 1896, the last half of July.

Quality, dessert, best; cooking medium; home market, very good; foreign market, useless.

Adaptation. Thrives well on sandy loam in the Niagara district.

Greening.

One of the staple varieties for profit in Ontario orchards. No one variety, except the Baldwin, was more widely planted in our Province previous to 1875, but since that time it has been liable to scab some seasons, especially in cases where proper spraying is neglected. Its color is against it in foreign markets, and yet, as it becomes known, the demand for it increases. It has a tendency to drop early, especially south of Lake Ontario, and, therefore, needs to be gathered in good season, about the first of October, as a rule. Remarkable instances of productiveness have been reported. One large tree at Maplehurst,' Grimsby, nearly one hundred years planted, yielded twenty barrels one season, and fifteen barrels another.

Greening.

Origin. Rhode Island.

Tree. Very vigorous, spreading, a crooked grower, fairly hardy, very productive, succeeds well on a great variety of soils.

Fruit, Large, roundish, sometimes a little flattened, regular, unless overgrown; color green, becoming lighter as it ripens, often showing a blush when well exposed to the sun; dots light gray, areole, numerous toward the apex; stem, seven-eighths of an inch long in a smooth, narrow cavity; calyx partly closed in a nearly smooth shallow basin.

Flesh, White, with a greenish tint, yellowing as it matures; texture, fine grained, crisp, juicy, flavor, rich, slightly amomatic, pleasant, sub-acid.

Season, December to February.

Quality, Dessert, medium; cooking, best; home and foreign markets, good.

Adaptation. Succeeds everywhere, except in northern sections.

Section of Greening.

KING. (King of Tompkin's County.)

Said to have originated in New Jersey. On account of its excellent quality for cooking, its peculiarly rich aromatic flavor, its beautiful appearance and large size, this apple is taking the highest place in the great apple markets of the world. Unfortunately the tree is a poor bearer, and consequently unprofitable as an orchard variety, unless under exceptional circumstances. Top grafted on Tolman Sweet, it is said to be more productive. For home use it is excelled by no apple.

KING.

TREE, a vigorous grower, of spreading habit, but not long-lived.

FRUIT, large, roundish, uneven; skin, yellowish, shading off from red to dark crimson; stem, short and stout, inserted in a wide, deep, somewhat irregular cavity; calyx closed in a broad, shallow, slightly corrugated basin.

FLESH, yellowish, white, crisp and juicy, moderately firm: flavor rich, agreeable, aromatic; quality first-class.

SEASON, October to February in Southern Ontario; reported at the Simcoe station October to March for Northern Ontario.

ADAPTATION. Not hardy at Simcoe station unless top grafted on Tolman Sweet, or some other hardy stock, and, therefore, it is not recommended for planting in northern sections.

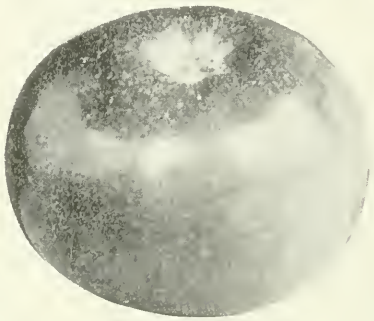
SECTION OF KING.

LADY.

(*In France Api.*)

A beautiful little apple for the amateur's collection, and very highly valued where known for a dessert apple, having a pleasant flavor and great beauty. In Europe the apple is known as Api, but in America it has become known as the Lady apple. Some say it was so called because from its small size and beautiful color, it seemed just suited to a lady's mouth.

ORIGIN, France.



LADY.

TREE, upright habit and bears fruit in clusters, vigorous, only fairly hardy and productive.

FRUIT, very small, flat oblate. Color, green turning to yellow, half covered with a rich red cheek, and many tiny dots which are more numerous toward the apex. Stem, slender, half an inch long set in a deep regular cavity. Calyx closed in a small wrinkled basin.

SECTION OF LADY.

FLESH, greenish white, fine grained, crisp and juicy; flavor, pleasant.

SEASON, December to May.

QUALITY, dessert, best; cooking, too small to be of any value; market, high value in special markets.

ADAPTATION. Successfully grown as far north as the Bay of Quinte station.

ONTARIO.

This is a native of Ontario, as its name indicates, having been raised by crossing Wagener and Spy by the late Charles Arnold of Paris, Ontario, one of the directors of the Ontario Fruit Growers' Association. Its early and abundant bearing, the good quality and even size of the fruit, are the reasons why it is rapidly gaining in favor as an export variety. It has been tested in a commercial way for some years at our Bay of Quinte station, where it is counted one of the best for profit. In 1879 the Ontario was distributed to the members of the Fruit Growers' Association, and favorable reports have been received from counties bordering on the lakes.

ONTARIO.

ORIGIN, Province of Ontario.

TREE, fairly hardy, moderately vigorous, somewhat spreading, very productive, an early bearer.

FRUIT, large, oblate, somewhat ribbed, sides unequal; skin, yellowish, nearly covered with bright red, with a few scattered small white dots with blush bloom; stem, seven-eighths of an inch long, in a deep, russeted, uneven cavity; calyx closed in a moderately deep, corrugated basin.

FLESH, white with green tint, yellowing slightly as it ripens; texture, fine grained, tender, juicy; flavor, mild, sub-acid, sprightly, aromatic.

SEASON, January to April.

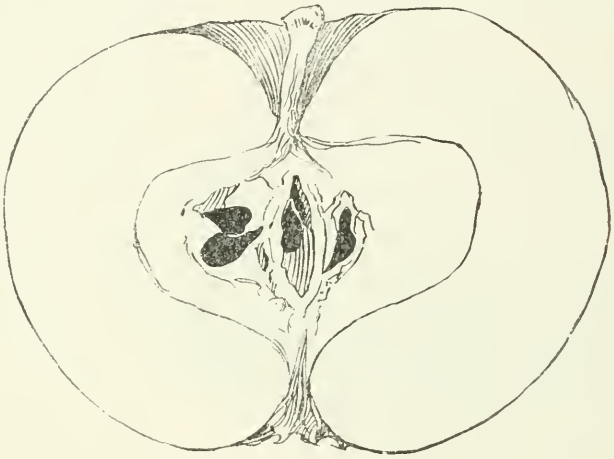
QUALITY, very good for all purposes.

SECTION OF ONTARIO

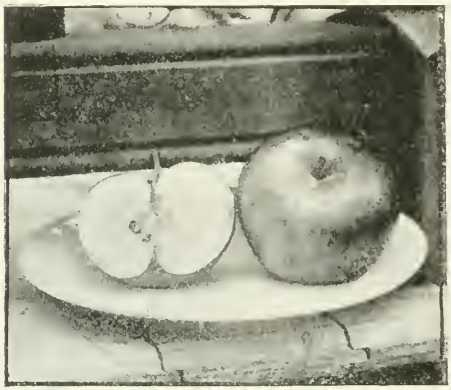
ADAPTATION. Southern Ontario to north shore of Lake Ontario. Succeeds remarkably well at Bay of Quinte station.

Red Astrachan.

Imported from Sweden to England in 1816, and widely planted in Southern Ontario for a summer market apple. Scarce another apple of its season equals it in beauty of appearance, for, in addition to its rich crimson color, it is often covered with a pale white bloom. Selected fancy grades of this apple are usually in good demand in our home markets, but sometimes there is a surplus, and prices even for Astrachans are very low.



Section of Red Astrachan.



Red Astrachan (Reduced).

Tree, upright; very vigorous; begins bearing early; very productive.

Fruit, medium to large, round, narrowing towards apex; skin, deep crimson when exposed to sun, yellowish-green in shade, often covered with a thin, whitish bloom; stem, stout, three-quarter inch long, in a deep, narrow cavity; calyx closed in a shallow, somewhat irregular basin.

Flesh, white, crisp, juicy, tender, becoming mealy when over-ripe; acid, almost too tart to be counted first-class for either dessert or cooking; quality, second class.

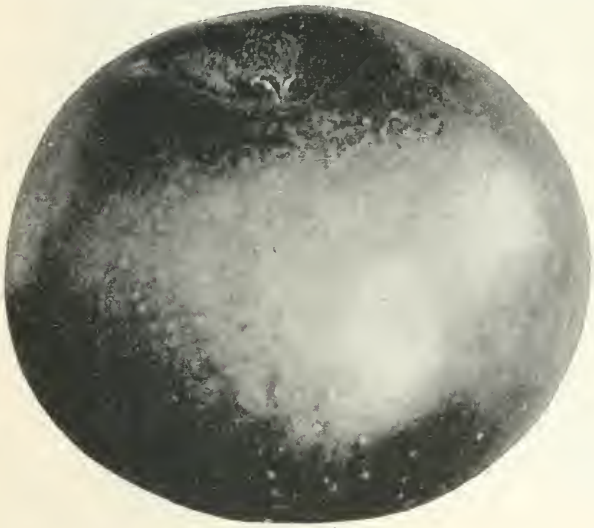
Season, 1st to 20th August.

Adaptation. In Niagara district perfectly hardy and productive. Two trees in 1895 at Maplehurst averaged ten barrels each. Not considered profitable at Simcoe station. Not hardy in northern parts of Ontario county.

Roxbury Russet.

(*Boston Russet.*)

One of the staple export varieties in many parts of southern Ontario, because of its long keeping qualities. It resists scab well, but is subject to the codling moth, unless well sprayed, and is inclined to drop early from the trees, resembling the Greening in this respect.



Roxbury Russet.

Origin, Massachusetts.

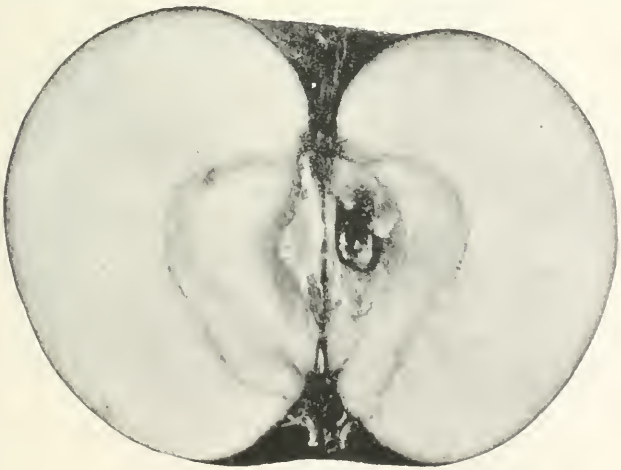
Tree, fairly vigorous, spreading like Greening, but flatter in form of top.

Fruit, medium, roundish oblate, sides not equal; skin tough, green, nearly covered with russet, and having a brownish red cheek when fully exposed to the sun; stem, half to three-quarters of an inch long in a medium sized, regular cavity; calyx closed, in a round medium sized basin.

Flesh, yellowish white, almost coarse grained, moderately juicy; flavor, mild, sub-acid, pleasant.

Season, January to June.

Quality, dessert, fair; cooking; good, home and foreign markets; good.



Section of Roxbury Russet.

Adaptation. Long tested in the Niagara district and found to be well adapted to it. As hardy as the Greening.

SPITZENBURGH.

(*Esopus Spitzenburgh.*)

One of the finest dessert apples for late winter use, and widely planted by early settlers throughout southern Ontario. It has proved to be unprofitable as a commercial apple, because the tree is liable to disease, and yields small crops in consequence.

SPITZENBURGH.

ORIGIN, Esopus, on the Hudson river.

TREE, lacking in vigor, often showing dead or feeble wood; upright, spreading, with drooping limbs when in bearing; fairly hardy.

FRUIT, size, medium to large, oblong, slightly conical; skin, straw color in shade, but usually nearly covered with bright red, and dark red in sun, with a few stripes, and many obscure gray dots; stalk, seven-eighths of an inch long in a narrow deep cavity; calyx, nearly closed, set in a narrow basin of medium depth, slightly corrugated.

FLESH, yellowish white; texture, crisp, juicy, breaking; flavor, brisk, rich, delicious.

SEASON. December to March.

QUALITY, first class for all purposes.

SECTION OF SPITZENBURGH.

ADAPTATION. Succeeds well on sandy loam in southern Ontario.

SPY. (*Northern Spy.*)

The Spy stands in the very first rank of Canadian apples, whether for home or foreign markets. Originating in New York State on the line with the southern portion of the Province of Ontario, it succeeds here to perfection. Its beauty of coloring, half shaded by its delicate bloom, and its great excellence of quality for all purposes, justly claim for it its wide popularity. In Chicago, Canadian Spys are more sought for than any other variety, but, owing to tenderness of skin, which shows the slightest bruise, it is less popular for export to Great Britain than some other varieties. The tree is late in coming into bearing, often being fifteen years planted before yielding a crop, and this renders the variety somewhat unpopular with planters. Probably for fancy packages, selected Spys would be among the best.

SPY.

ORIGIN, near Rochester, N.Y.

TREE, Upright and spreading in habit; fruit spurs on interior boughs, very vigorous, late in coming into bearing, but afterwards fairly productive in alternate years; blossoms late in spring and holds its fruit late in the autumn; requires high cultivation and good fertility.

FRUIT, large to very large; form, roundish, slightly conical; skin, thin, light green, or pale yellow, sprinkled with light pink, striped and shaded with pinkish red, and thinly covered with thin whitish bloom; stalk, slender, three-quarters of an inch long, in a wide, deep, sometimes russeted cavity; calyx, small, closed, in a narrow, moderately deep, abrupt, irregular basin.

FLESH, white, fine-grained, crisp, tender, juicy; flavor, rich, sprightly, subacid, fragrant.

SEASON, January to May.

QUALITY, dessert and cooking, first-class: home market, first-class; a little tender for distant shipments.

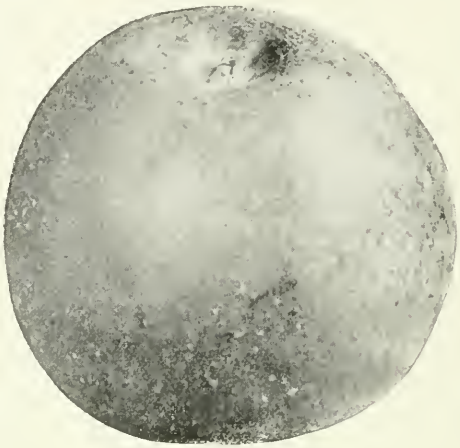
SECTION OF SPY.

ADAPTATION. Sandy or clay loams in southern and middle Ontario; found tender at Simcoe Experiment Station and at the St. Lawrence Experiment Station.

Swazie Pomme Grise.

(*Pomme grise d'or.*)

There is no choicer winter dessert apple for the months of December and January than the Swazie Pomme Grise, especially when kept in a cool, dark cellar, as that its crisp texture and excellent flavor may be preserved. Unfortunately, it is not very productive, and, consequently,



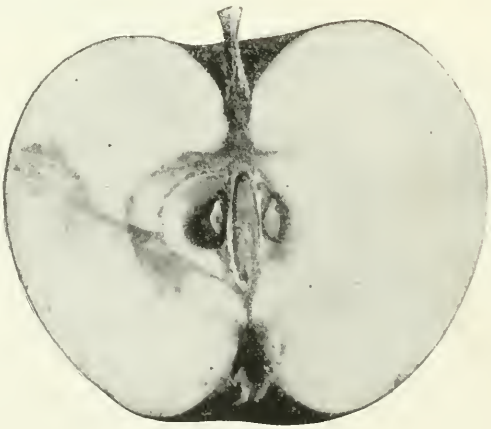
Swazie Pomme Grise.

not profitable. One large tree at Maplehurst, seventy-five years planted, yielded only an average of four barrels each alternate year. It is well worthy of a place in the amateur collection.

Origin, probably with Col. Swazie, near Niagara.

Tree, upright, fairly vigorous and not very productive.

Fruit, small, round, oblate conical; color, deep yellow, well colored with cinnamon russet and many whitish dots; stem, three quarters of an inch long, set in a deep cavity; calyx, closed in a moderately deep, slightly corrugated basin.



Section of Swazie.

Flesh, white, fine grained, tender, crisp, juicy; flavor, aromatic mild sub-acid, pleasant.

Season, December to March.

Quality, dessert, best; cooking, poor; value for home market, poor; value for foreign market poor.

Adaptation. Succeeds in southern Ontario, especially in the Niagara district.

WEALTHY.

This beautiful apple was distributed among the members of the Ontario Fruit Growers' Association in 1882 for trial, and has won for itself a good reputation in every part of the Province as a dessert apple of excellent quality, while in the northern portions it is especially desirable on account of its hardiness. Mr. A. A. Wright, of Renfrew, says the tree endures 40° below zero without injury, and he advises planting this variety freely at the north. Mr. R. W. Shepherd, of Montreal, has grown it in that vicinity for years with success for export.

WEALTHY.

ORIGIN, St. Paul, Minnesota. By Peter Gideon.

TREE, vigorous, very hardy, over productive.

FRUIT, medium, roundish, oblate, regular; skin, smooth, greenish ground, changing to pale yellow, rich red cheek, with stripes and splashes of red in the sun, sometimes nearly covered with crimson; stem, one-half to three-quarters of an inch long in a deep, regular cavity; calyx, nearly closed in a deep, abrupt basin.

SECTION OF WEALTHY.

FLESH, white, fine grained, tender, juicy, sprightly, pleasant sub-acid.

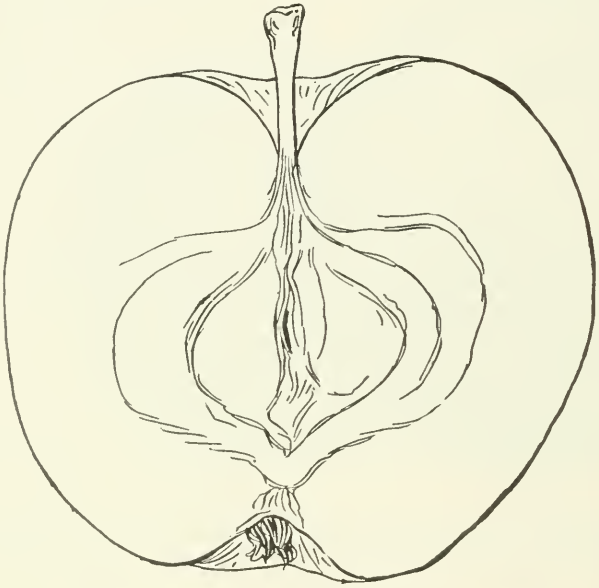
SEASON, early winter.

QUALITY, dessert, very good; cooking, good; value for home market, very good; value for foreign market, very good.

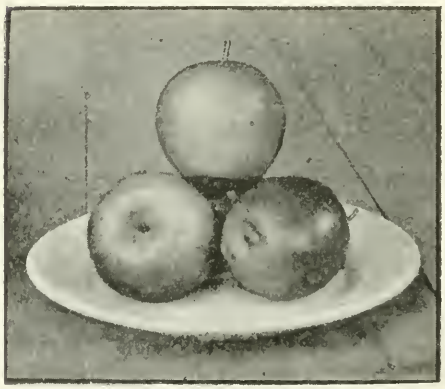
ADAPTATION. Succeeds at Simcoe, Bay of Quinte, St. Lawrence and Niagara stations, also at Ottawa and Montreal.

YELLOW TRANSPARENT.

An apple which may prove a substitute for the well-known Early Harvest, which is so subject to apple scab. This variety seems to be proof against fusicladium, both in leaf and fruit.



YELLOW TRANSPARENT.



YELLOW TRANSPARENT (Reduced).

ORIGIN, St. Petersburg, Russia. Imported by the U. S. Department of Agriculture in 1870.

TREE, hardy, vigorous, upright, annual bearer, productive, began bearing at four years at Craighurst station.

FRUIT, above medium, roundish, oblate, inclined to be conical ; skin, clear white, yellowish white when very mature ; dots, light green, obscure ; stalk, medium, in large cavity ; calyx closed in medium slightly corrugated basin ; fruit hangs well on the tree.

FLESH, white ; firm till very ripe, then tender ; quality, second class.

ADAPTATION. Tested at Maplehurst, Grimsby ; at Simcoe station, and distributed widely by Ontario Fruit Growers' Association in 1886.

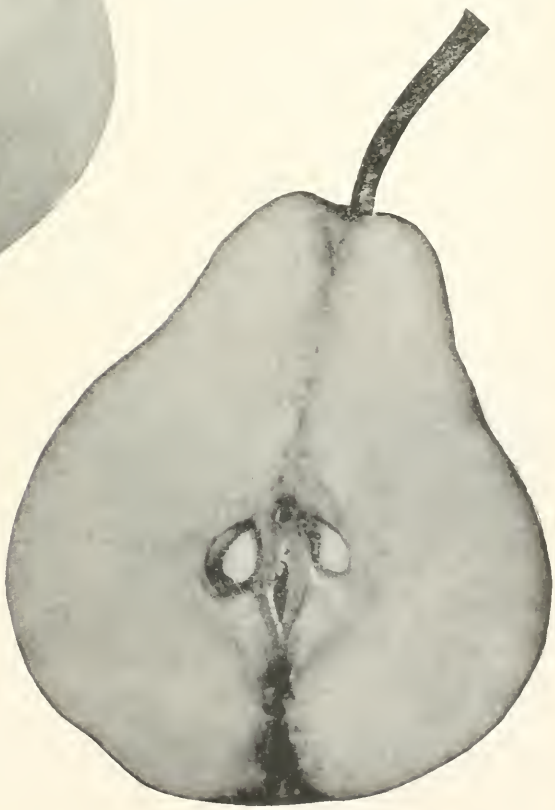
PEARS.

Bartlett.

(In England, Williams' Boncretien.)

No pear of the same season equals in popularity the Bartlett, for either dessert or canning. Indeed, while it is in the market, no other pear compares with it in price or brings as much profit to the grower. Of late large orchards of this one variety have been planted in Canada and the northern States, and immense quantities of this pear are also shipped in car lots from California to our eastern cities, often causing the price to rule very low. In 1896 first-class Bartletts were sold in Toronto during a great part of September at from 30 to 40 cents a basket, and ordinary stock for $2 and $3 a barrel.

Origin, Berkshire, England, 1770, propagated by Mr. Williams, near London. Introduced into America and disseminated by Enoch Bartlett of Boston.



Tree, healthy, vigorous, half-hardy, overcomes blight better than most varieties, very productive.

Fruit, large, oblong, obtuse, pyriform. Color, yellow, with very numerous minute brown dots, often russetted at the apex. Stem, 1¼ inches long, in a small irregular cavity. Calyx, open in an irregular basin.

Flesh, creamy white, fine grained, very buttery and juicy; flavor, sweet, perfumed, vinous.

Season, September.

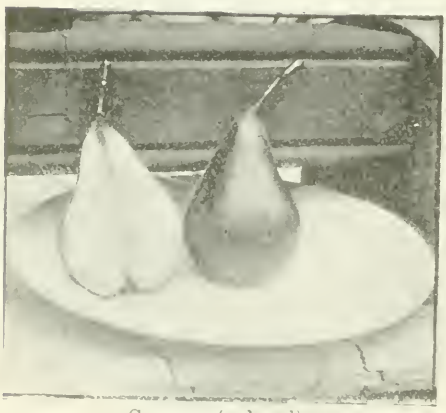
Quality, dessert, very good, market, best.

Adaptation, succeeds admirably in southern Ontario, and as far north as our Bay of Quinte station.

BEURRE GIFFARD.

An excellent early summer pear, of large size and good quality. Probably none of its season is more desirable both for home use and market.

SECTION OF BEURRE GIFFARD.



GIFFARD (reduced).

ORIGIN, chance seedling with M. Giffard, Angers, France

TREE, moderately vigorous, healthy and productive.

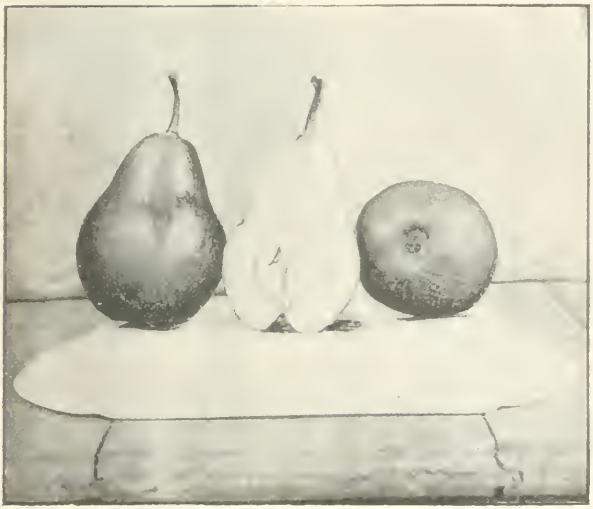
FRUIT, medium, acute pyriform ; skin, greenish-yellow, shaded with red in the sun ; calyx closed in a very shallow basin.

FLESH, white, melting, agreeable aromatic flavor.

SEASON, August.

Tested on top graft four years at Maplehurst, Grimsby : also at the Wentworth Experiment Station.

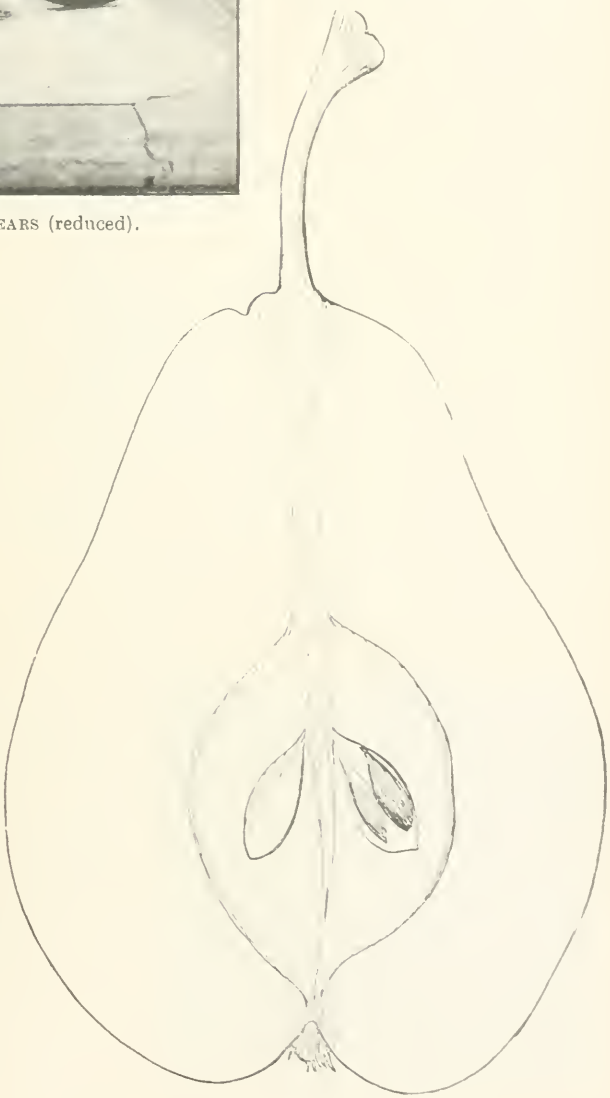
DEMPSEY.



A PLATE OF DEMPSEY PEARS (reduced).

The Dempsey was originated near Trenton in Prince Edward County, by Mr. P. C. Dempsey, the late well-known Director of our Association for that district. It was produced from a seed of a Bartlett, fertilized with Duchess d'Angouleme. The tree is a good grower and quite productive. The fruit is firm and consequently would ship well.

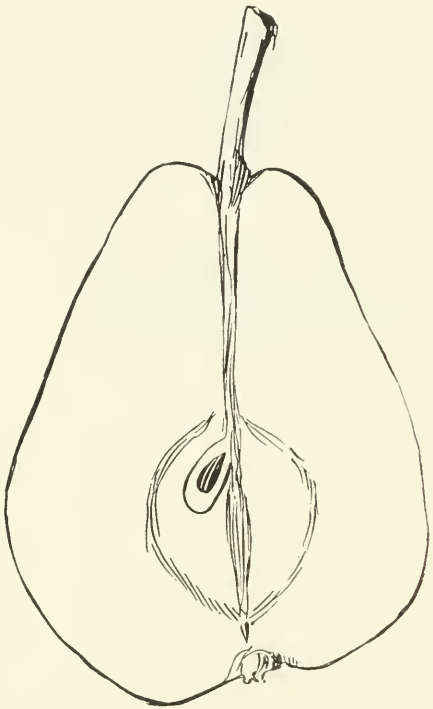
DESCRIPTION: Fruit large, oblong, obovate, pyriform; skin smooth, yellowish-green, with brownish-red cheek in sun; stem about one inch long, set in a fleshy base, and with almost no cavity; calyx nearly closed in a moderately deep uneven basin, core small. Flesh white, fine grained, tender, almost melting, with sweet delicious flower. Season, last of October, November.



SECTION OF DEMPSEY PEAR

Buffum.

A reliable kind for health of tree and productiveness, but its season follows the Bartlett too closely to be of any great value in the market. Besides, there are other varieties of about the same season which are more desirable for both table and market, for the fruit is often below medium size and of only fair quality.



Section of Buffum.

Buffum (Reduced).

Origin, Rhode Island.

Tree, very upright, vigorous, productive, not subject to blight.

Fruit, medium, oblong, obovate, slightly one-sided; skin, yellowish, with a brownish-red cheek, with small brown dots; stalk, one inch long, in a very small cavity; calyx closed in a small regular basin.

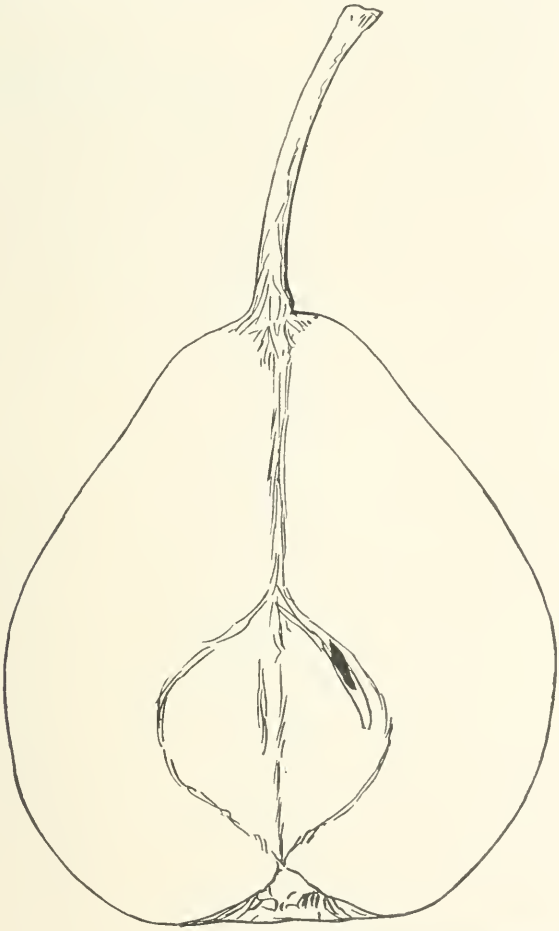
Flesh, white, buttery, moderately juicy, slightly granular, of agreeable aromatic flavor.

Season, September 20th to October 1st.

Tested at Maplehurst thirty years.

HOWELL.

One of the best market pears of its season for Southern Ontario, especially where grown on a standard. Its vigor of tree, regularity of bearing, clear skin, and good size and quality make it a desirable variety for the commercial orchard.



SECTION OF HOWELL.

ORIGIN, New Haven, Conn. Named after the originator, Thomas Howell.

TREE, upright, healthy and vigorous, an early bearer, productive.

FRUIT, large, obovate pyriform ; skin, yellowish green, waxen, reddish dots on sunny side, russet dots in shade ; stem one and three-quarter inches long : no cavity, sometimes lipped ; calyx partly open in a deep russeted basin ; core small ; seeds few, small.

FLESH, creamy white, juicy, melting, granular near the core : flavor agreeable vinous : a little tart.

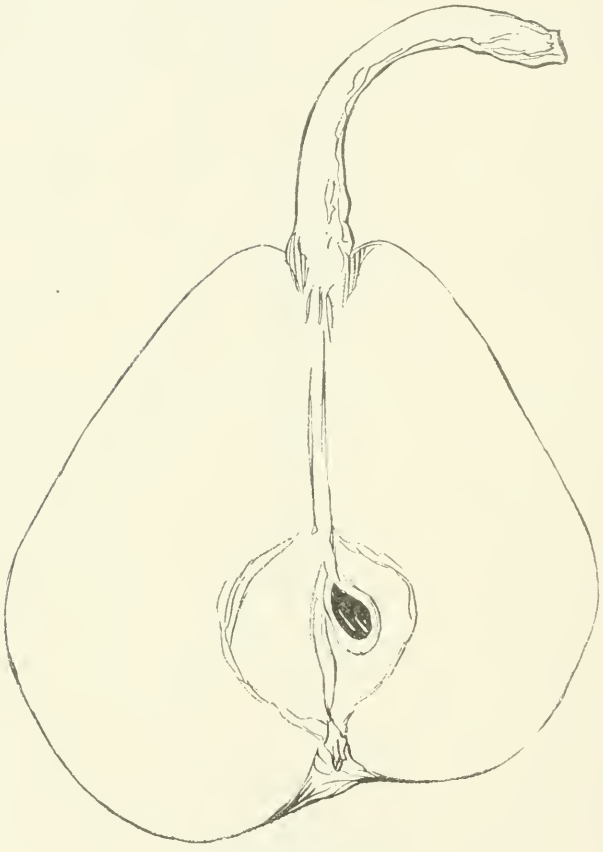
SEASON, middle September to middle of October.

Tested twenty-five years at Maplehurst, Grimsby

HOWELL (Reduced).

King Sessing.

A worthless variety for either home use or market, because it always decays at the core, while still apparently sound.



Section of King Sessing.

King Sessing (Reduced).

Origin, near Philadelphia.

Tree, fairly vigorous, of sprawling habit.

Fruit, large, obovate, obtuse pyriform ; skin, greenish-yellow, with minute greenish dots ; stem, two inches long, curved, fleshy at its insertion in a small uneven cavity ; calyx small, closed in a deep irregular basin ; core small, inclined to rot.

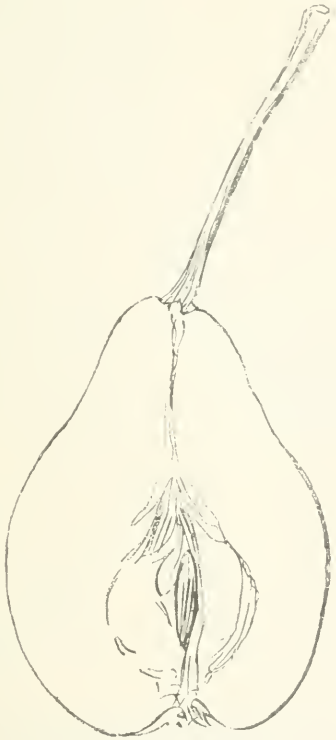
Flesh, whitish, juicy, melting and of good flavor.

Season, September 20th to October 1st.

Tested thirty years at Maplehurst.

ROSTIEZER.

A small unattractive looking pear, of very high quality. It is the best of its season in quality for dessert purposes, and should have a place in the home garden. What the Seckel is in October, this pear is in August. Packed in small packages and labelled "extra quality dessert pears," the writer was able to sell them at a fancy price, but usually the pear sells far below its value on account of its ordinary appearance.



SECTION OF ROSTIEZER.

ORIGIN, Foreign.

TREE, healthy, vigorous, sprawling habits, shoots few, and need shortening in.

FRUIT, small to medium, obovate, oblong pyriform; skin, green, sometimes turning yellowish, with reddish-brown cheek; stem slender and nearly two inches in length; calyx open; basin small.

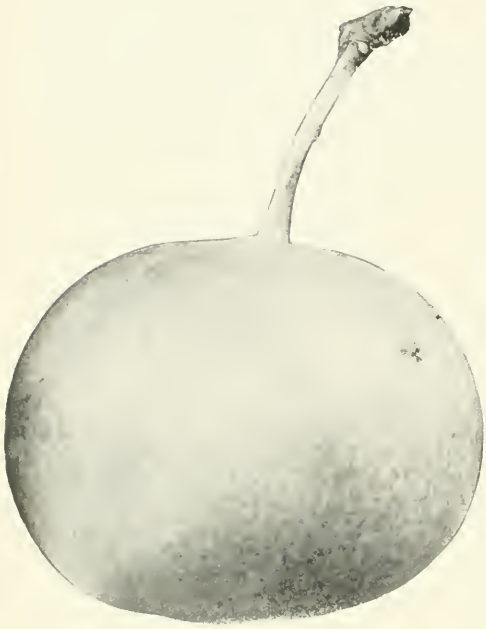
FLESH, juicy, melting, sweet, very delicious, of very finest quality.

SEASON, middle to end of August.

Tested twenty years at Maplehurst.

ROSTIEZER (Reduced.

SAPIEGANKA.



SAPIEGANKA.

A Russian pear of fine appearance, scions of which were sent out to the Secretary of the Ontario Fruit Growers' Association in 1892 by Mr. Jaroslav Niemetz, of Winnitza, Podolie, Russia. It fruited at Grimsby in 1895 and 1896, ripening about August 12th to 20th. Its fine appearance is in its favour, but its quality is inferior to other varieties of its season, and, unless it should prove desirable on account of its hardiness, would not be worthy of general cultivation. Mr. Niemetz says, "In its home in Lithuania, old and large trees are met with which have endured many and severe winters In the Tamboff Government, it is the most hardy of all pears there grown, and, therefore, is certainly a hardy variety. The flavor of the fresh depends upon local conditions, for, though it is tasteful enough in the warmer districts, it is sometimes harsh; when grown in the north is juicy and buttery." Unfortunately the tree is subject to blight.

TREE, hardy, productive but subject to blight.

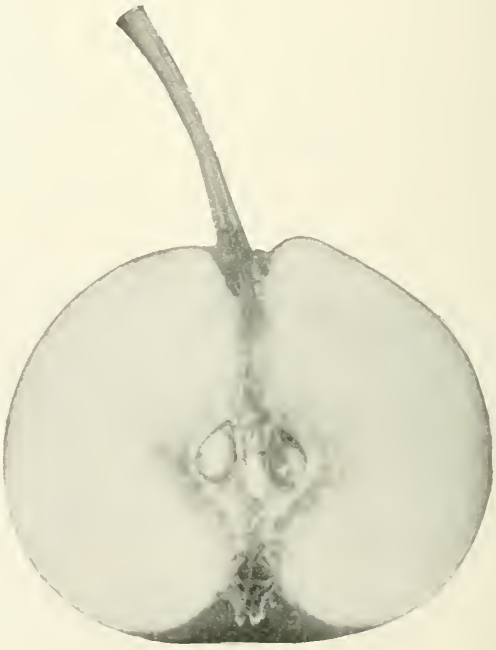
FRUIT, medium size, oblate, often somewhat flattened; color, brownish yellow, with brownish red in sun, with numerous small dots; stem, long in small cavity; calyx, segments large, partly open in a broad, wrinkled base.

FRESH, white, texture coarse, somewhat firm and juicy; flavor, sweet and agreeable.

SEASON. August 12th to 20th.

QUALITY, dessert, poor; cooking, poor, home market, fairly good; distant market, poor.

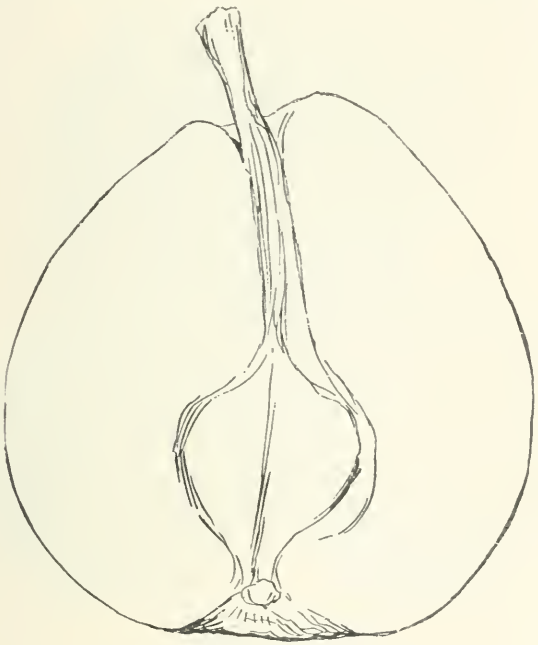
ADAPTATION. Succeeds well at Grimsby. Tested by the Dominion Experimental Farm system and found tender in Manitoba and the Northwest, but perfectly hardy at Ottawa and in Muskoka.



SECTION OF SAPIEGANKA.

SHELDON.

One of the most delicious of dessert pears, if eaten just at the proper time. Worthy of a place in every home garden, but not productive enough to be planted for market.



SECTION OF SHELDON.

ORIGIN, accidental on farm of Norman Sheldon of Huron, Wayne Co., N. Y.
TREE, vigorous, erect, not very productive, late coming into bearing.

SHELDON.

FRUIT, above medium in size, roundish, obtuse obovate; skin, yellowish-green, covered with thin light russett, brownish crimson in sun, russet dots; stalk, short, stout, in a narrow cavity; calyx nearly open, in a broad basin.
FLESH, creamy, buttery, juicy, sweet, aromatic.
SEASON, October.
Tested twenty years at Maplehurst.

PEACHES.

Alexander.

The earliest peach grown in the Niagara district and in Essex county. It is a clingstone, of poor quality for dessert purposes, and poor also for cooking, so that, in competition with yellow-fleshed Elbertas and Crawfords from southern peach orchards, it sells at a low price in our markets.

Alexander (reduced)

Origin, chance seedling, Mount Pulaski, Ill., on farm of A. O. Alexander.

Tree, vigorous, hardy, productive.

Fruit, medium, globular, sides unequal ; color, greenish, suffused with dark and light red ; suture, broad ; apex, slightly sunken.

Section of Alexander.

Flesh, greenish white, firm, juicy, half melting, clings to stone ; flavor, sweet and fairly good.

Season, July 20 to 30.

Quality, dessert, poor ; cooking, poor ; home market, poor ; distant market, very poor.

Adaptation. Succeeds at Niagara and Southwestern stations.

CRAWFORD'S EARLY.

Crawford's Early has long held its place at the head of the list of peaches both for home use and for market. Its beautiful golden color, its large size, its free stone and rich flavor all

CRAWFORD'S EARLY

unite in giving it a just claim to this position. Its buds are a little more tender than those of some other varieties, and, consequently, many growers hesitate to plant it, but where high cultivation and plenty of fertilizer is given, fine crops of luscious fruit have resulted.

ORIGIN, Middleton, N.J., by Wm. Crawford.

TREE, vigorous, productive under favorable conditions.

SECTION CRAWFORD'S EARLY

FRUIT, large to very large, oblong ; suture, shallow : apex, prominent, swollen ; color golden-yellow, with rich red cheek.

FLESH ; yellow, sweet, rich, free from stone which often parts in middle when nearly ripe.

SEASON, last of August.

QUALITY ; dessert and cooking, very good : market value, best.

ADAPTATION. Niagara district and parts of Essex county.

GRAPES.

Concord.

The principal out-door grape grown for market in the province of Ontario. Probably more than half the vines in the large commercial vineyards of the Niagara district, as well as in Essex and other parts of southern Ontario, are of this variety.

The reason of this is (1) its comparative freedom from mildew, (2) its vigor of vine, (3) its productiveness. Four tons to the acre is not an uncommon yield, so that, even if it sells as low as 1½ cents per pound, there is yet a fair return for the investment. Still it is an open question whether in the near future it will not pay the grower better to plant varieties of higher quality that will bring a higher price, though they may be less productive.

Origin, Concord, Mass., by E. W. Bull. First exhibited by him in 1853.

Concord.

Vine, hardy, healthy, strong, vigorous grower, very productive, resists both insects and ungi well.

Bunch, large, shouldered, fairly compact, five to six inches in length.

Berry, large, round, black, covered with heavy blue bloom; skin, medium thickness, tender, sometimes cracks open; flesh, pulpy, tender, moderately juicy; flavor, sweet when fully mature, appetizing.

Season, middle of September and October; not a good keeper.

Quality, dessert, fair; near market, good; distant market, poor.

Adaptation. Tested at Wentworth, Niagara, Southwestern and Bay of Quinte stations, in all of which it ripens well in the open air.

Delaware.

Universally acknowledged to stand at the head of all American grapes in point of quality. For the home garden a few vines of this variety are indispensable, for it is the most excellent of dessert varieties. It is also one of the highest priced grapes in our markets, often bringing more than double the price of the Concord. It is, however, not very much grown in our commercial vineyards, because the foliage is badly subject to thrip and the yield is only moderate. On rich deep soils, well drained, however, with high cultivation, thinning and close pruning, it is productive and profitable. It should be planted much closer than the Concord. Vines of the latter variety are usually planted ten feet apart, while the Delaware may be set five or six feet apart.

Delaware.

Origin, unknown. Name from Delaware, Ohio, where in 1855 it was first brought into notice, though not disseminated until ten years later. It was first found in a garden in Frenchtown, N.J. The Bushberg Catalogue thinks it a natural cross between Labrusca and Vinifera, a native American and a European variety.

Vine, moderate grower, foliage delicate, subject to thrip; wood slender, hardy, regular, sometimes an abundant bearer.

Bunch, small, compact, usually shouldered.

Berry, small, round; skin, thin, beautiful light red, with whitish bloom, translucent; pulp sweet, sprightly, aromatic; juice abundant, sweet, vinous.

Season, September.

Value, dessert, best; market, best.

Adaptation. Succeeds at the Niagara, Wentworth, and Bay of Quinte stations, and throughout the southern and middle portions of the province generally.

CHERRIES

Black Tartarian.

Of all our black cherries, this is one of the choicest, whether for market or for dessert on the home table. Of large size and delicious flavor, it is relished by all cherry lovers, and, being somewhat soft fleshed, it is very subject to the ravages of birds. On this account it is often necessary to harvest and ship it a little on the green side. It is not so productive as some others, but it makes this up by bringing a higher price. Origin, Russia and Western Asia, introduced into England in 1796 and thence to America.

Black Tartarian.

Tree, erect, vigorous, attaining large size, fairly productive.

Fruit, very large, heart shaped, of somewhat irregular outline; stem, 1¼ inches long; skin, bright purplish black.

Flesh, dark purple, tender and juicy; flavor, rich and delicious.

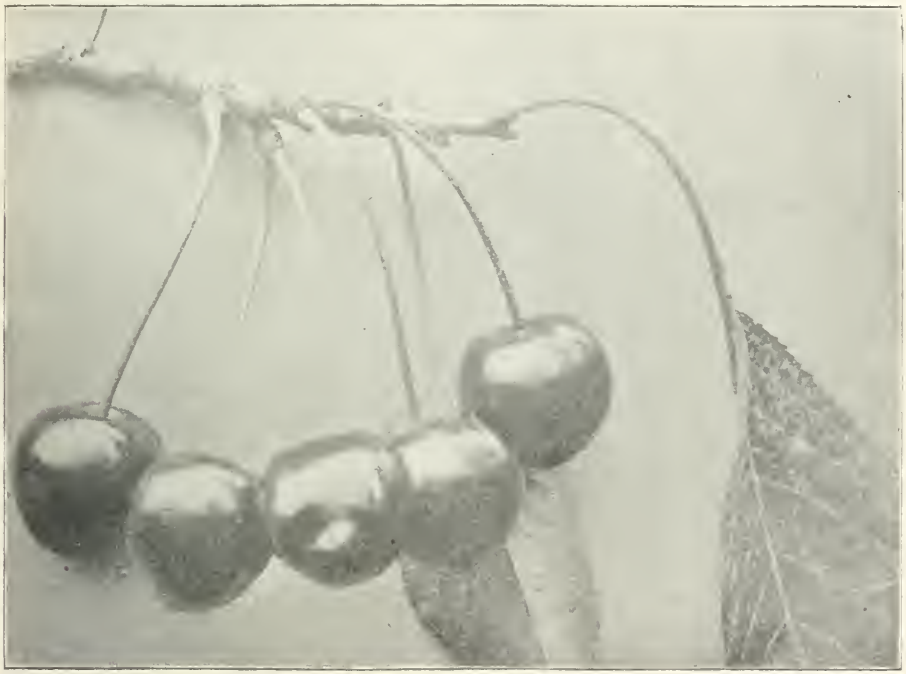
Season, June 22nd to 30th.

Adaption. South of Lake Ontario, and in sheltered places a little further north.

Early Purple.

(Early Purple Guigne).

The earliest cherry is the Early Purple, a foreign variety known in France as the Early Purple Guigne. The tree is a vigorous, upright grower, and becomes quite productive as the tree acquires age. A tree at Grimsby, about thirty years planted, yielded in 1896, 144 quarts. They were harvested on the 11th of June, and sold in the wholesale market at an average of twelve cents per quart. This is the tree's best record, for usually the birds destroy the fruit before it matures, and if gathered as soon as colored red, it is little more than "skin and bones." The last few days of growth it fills out wonderfully, and becomes almost a so-called "black cherry." The branch which we photographed was taken from the tree above referred to and shows the habit of fruiting.



Early Purple.

Tree, upright, vigorous, healthy, productive when full grown.

Fruit, medium size, roundish heart-shaped; skin dark red to purple; stem two inches long in a shallow cavity; suture obscure.

Flesh, red to purple; texture tender, juicy; flavor sweet and pleasant.

Season, June 10th to 15th in 1896, south of Lake Ontario.

Quality, dessert, good; market, good.

Adaptation. Grown at Grimsby for thirty years and quite hardy fairly hardy in Maine and Michigan; recommended for trial north of Lake Ontario.

GOVERNOR WOOD.

This variety has been grown on the grounds of the secretary, Mr. L. Woolverton, at Grimsby, for thirty years (1865-1895) and has proved itself the most satisfactory cherry of its season for both dessert and market purposes. It is a very productive variety, often averaging 100 quarts to a tree, and, though somewhat tender in flesh, is not nearly so subject to ravages by birds as Early Purple or Black Tartarian. Originated by Prof. Kirtland of Cleveland, Ohio, U. S. A.

GOVERNOR WOOD.

TREE, upright, spreading, healthy, vigorous and hardy wherever the peach succeeds.

FRUIT, medium to large, roundish-heartshaped; skin, light yellow, shaded with light to deep red; stem 1½ inches long in a broad deep cavity; suture, distinct on one side.

FLESH, yellowish, tender, juicy, sweet, aromatic and delicious.

SEASON, June 16th to 25. (June 12th to 15th in 1896).

QUALITY, dessert, very good; cooking, good; home market, very good; distant market good.

ADAPTATION. Wherever the peach succeeds.

Napoleon.

(Napoleon Bigarreau, Royal Anne of California.)

A valuable variety of foreign origin. Perhaps the most productive variety known, yielding fruit of the very largest size which is in good demand and, therefore, one of the most desirable varieties for the commercial orchard. It has one serious fault, namely, it is very subject to the rot, especially in wet seasons, and sometimes the whole crop of this variety is ruined by it.

Napoleon.

Tree, upright, spreading, vigorous, hardy on the south shore of Lake Ontario. Very productive.

Fruit, very large, oblong heart shaped; skin, yellow ground, light in shade, rich red cheek in the sun, sometimes mottled; stem, 1⅛ inches long; suture plainly traceable.

Flesh, yellowish white, very firm, meaty, fairly juicy, good flavor, much esteemed for canning because it looks well in the jars and bears cooking well.

Season, July 1 to 6.

Quality, dessert medium; market, very good to best.

Adaptation, the southern part of the Province of Ontario.

ROCKPORT.

A Bigarreau originated by Prof. Kirtland, of Cleveland, Ohio. Its season of ripening is about the same as Governor Wood, but it is a heavier bearer of fruit, about the same size and less highly colored. It would be profitable were it not so subject to rot, but nearly every year we have lost a large portion of the crop of this variety at Maplehurst from this cause. In the season of 1896 there was no rot, and a tree of this variety yielded about 100 quarts. Like the other bigarreaus, it is too firm a cherry to be a favorite with the birds.

ROCKPORT.

TREE, upright, spreading, fairly vigorous and very productive.

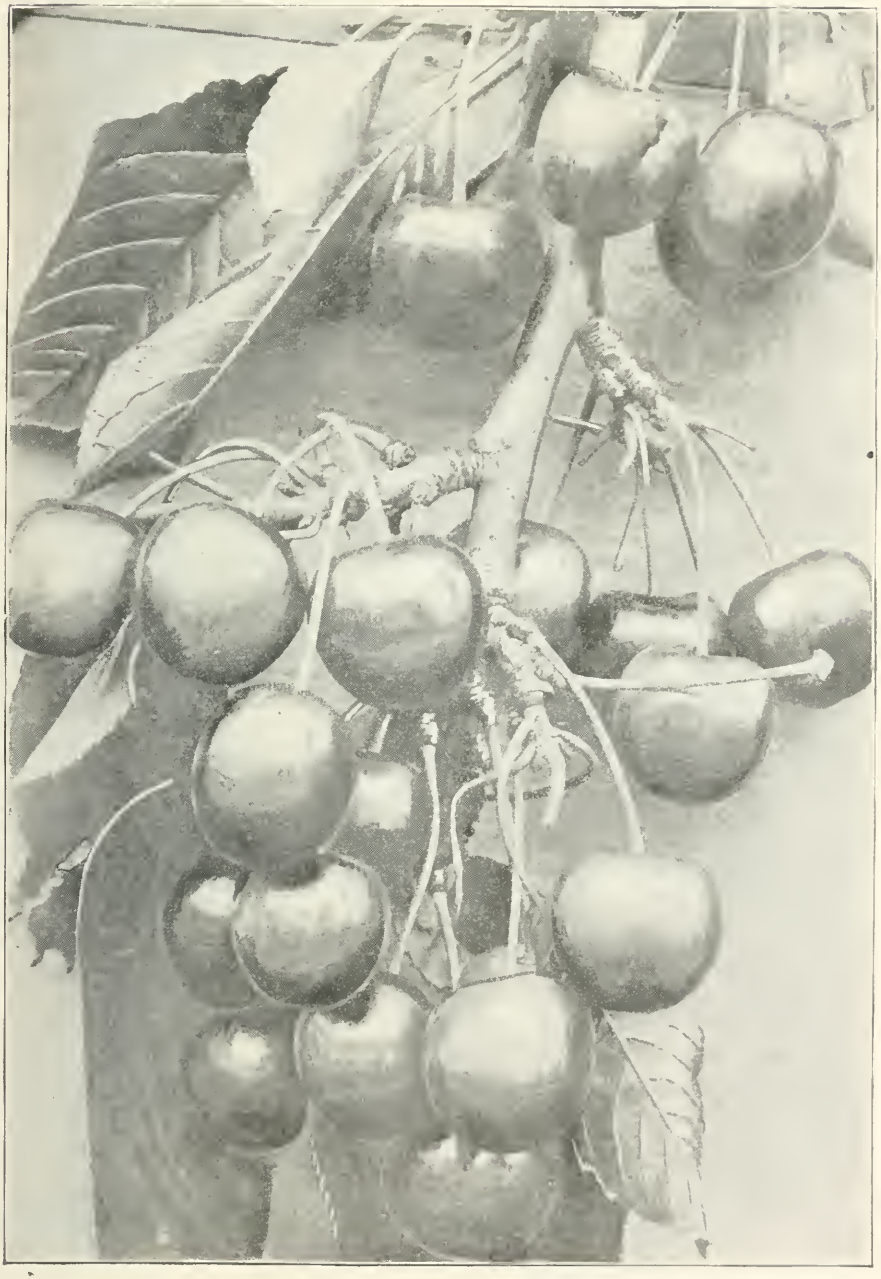
FRUIT, large, roundish, obtuse heart-shaped; skin, amber, nearly covered with bright red.

FLESH, pale yellow; texture, firm, juicy, flavor, sweet and good.

QUALITY, dessert or cooking, medium. Home market, medium.

SEASON; June 17 to 30.

ADAPTATION. Southern Ontario



Yellow Spanish—Fruiting Branch in 1896.

YELLOW SPANISH.

Of all the Bigarreau cherries this is one of the finest, both on account of its great size and its delicious flavor. The tree grows to a very large size, surpassing in this respect any other cultivated variety with which we are acquainted. It does not average very productive, because the fruit often blasts and drops, or is destroyed by Monilia. When, however, it does mature a good crop, as in 1896, the yield is wonderful; indeed in 1896 one tree at Maplehurst yielded 360 quarts of beautiful fruits! This of course was an exceptional yield. (See engraving of fruiting branch.

The variety is of European origin, and was introduced into the United States in 1800.

YELLOW SPANISH.

TREE, very vigorous, of large growth, spreading, very productive.

FRUIT, very large and of a beautiful waxy lustre; form, round, obtuse, heart-shaped; skin, clear amber, nearly covered with red when exposed to the sun; stem, stout, 1½ inches long in a wide cavity; suture, traceable.

FLESH, pale yellow; texture firm, juicy, breaking; flavor, sweet, delicious when well ripened.

SEASON, June 25 to 30 in 1896.

QUALITY, dessert very good; market very good to best.

ADAPTATION Succeeds in peach sections, on well drained sandy soil.

STRAWBERRIES

Clyde.

(Perfect blossom.)

Originated in Kansas, from seed of the Cyclone, about 1890, by Dr. Stayner, the Cyclone being produced from Crescent crossed with Cumberland. Thus we find out where the Clyde gets its great hardiness and productiveness, viz., from the Crescent. The first berries are as large as the Bubach and very productive. It grows very much like its parent Cyclone, also like the Haverland, but more vigorous than either. It has secured for itself very quickly a place among the standards, if it does not stand first, which place many are claiming for it.

Plant, a strong and vigorous grower. Perfect in every respect. No rust or trace of disease. Its fruit stalk is just the right length and strong enough to hold up the great load of fruit. In color, light, like Haverland. Strong, and has many runners that take root easily.

Fruit, very large, as large as Bubach, roundly conical, bright dark scarlet in color, and very firm.

Flesh, pinkish white, fine eating, very pleasant to the taste, quality first-class.

Season, second early.

Adaptation. Does well everywhere and in all soils. (E. B. S.)

Clyde (Engraved from a photograph.)

HAVERLAND.

(*Imperfect blossom.*)

Originated in Ohio by Mr. Haverland. Parentage unknown. Widely planted, and is one of the most productive. It's only fault is that in a wet season the fruit is somewhat soft. On the whole it is one of the best.

PLANT, very healthy. Vigorous grower, sending out strong runners. Its foliage is magnificent. Fruit stalk is very long and often not able to bear up the immense load of fruit the plant matures. Light in color of leaf.

FRUIT, large to very large, long, bright scarlet, medium in firmness.

FLESH, pinkish, sweet and good quality.

SEASON, it is one of the first to ripen and continues all through the season.

ADAPTATION. It succeeds well everywhere and all soils suit it. (E. B. S.)

HAVERLAND (Engraved from photograph.)

MEETINGS OF THE BOARD OF CONTROL IN 1896.

The Board of Control met in the Railway Committee room of the House of Parliament, on the 28th of January, at eleven o'clock. There were present Dr. Mills, Chairman; H. L. Hutt, Horticulturist; L. Woolverton, Secretary, and Messrs. Wellington, Smith and Pettit.

Lists of fruits were presented by the Secretary and revised by the Board. Ordered, that these lists be further enlarged and the stock ordered for the various stations.

Ordered that the following list of stations be recommended to the Department for the year 1896, with specialties as set down opposite the title of each, viz. :

No.	Name.	Location.	Specialty.	Experimenter.
1.	Southwestern Station,	Leamington, Essex county	Peaches	W. W. Hilborn.
2.	Niagara,	near St. Catharines, Lincoln county	Tender fruits	M. Burrell.
3.	Wentworth,	near Winona, Wentworth county	Grapes	M. Pettit, Winona.
4.	Burlington,	near Burlington, Halton county	Blackberries, currants and commercial pears	A. W. Peart, Freeman.
5.	Lake Huron,	Walkerton, Bruce Co.	Commercial apples and raspberries	A. E. Sherrington.
6.	Georgian Bay,	near Clarksburg	Plums	John Mitchell.
7.	Simcoe,	Craighurst, Simcoe county	Hardy apples and hardy cherries	G. C. Caston.
8.	East Central,	Whitby, Ontario Co.	Pears and commercial apples	R. L. Huggard.
9.	Bay of Quinte,	near Trenton, Northumberland county	Apples	W. H. Dempsey, Trenton.
10.	St. Lawrence,	near Prescott, Grenville county	Hardy pears and plums	Harold Jones, Maitland.

Sub-stations.

11.	Strawberry Station, Guelph	E. B. Stevenson, Freeman.
12.	Gooseberry Station, Nantye, Simcoe county	Stanley Spillett

Ordered, that the following appointments be settled upon by this Board: A. E. Sherrington, Walkerton, commercial apples and raspberries; R. L. Huggard, Whitby, pears and commercial apples; Harold Jones, Maitland, hardy pears and plums.

Ordered, that the Secretary write delinquent experimenters notifying them that any extra allowance at any time will be wholly dependent upon the amount of special records made of experimental work, and that the maximum allowance is conditioned upon such station being kept to the satisfaction of the executive.

The estimates for 1896 were considered and the sum of $2,605 approved of by the Board as the probable expenditure in 1896.

Ordered, that the Secretary explain to each experimenter that any books or nozzles furnished them for use, are to be considered the property of this Board.

Ordered, that the Secretary confer with the Minister regarding the bottles necessary for preserving fruits for the Industrial.

Ordered, that the Secretary be authorized to engage assistants at the Industrial, at the rate of $2 per day.

Ordered, that the Secretary and Mr. Hutt prepare a circular for each experimenter, calling attention to the importance of keeping careful records of experimental work for the report.

The annual meeting of the Board of Control for 1896 was held at Ontario Agricultural College, Guelph, on Monday evening, the 16th November, at 7.30 p.m.

The Secretary read the minutes of the previous meeting, which were approved. He also reported that in carrying out the instructions of the Board, he had ordered for the Stations the following varieties of fruits, together with some duplicates of varieties previously sent. The reason for sending duplicates was in some cases to make sure of the identity of varieties by securing them from different sources, and in others to make up for varieties which had died out, or to have the varieties tested as trees which were first tested only as scions.

VARIETIES ADDED TO THE STATIONS IN 1896.

No. 1—SOUTH-WESTERN STATION.

Peaches.—45 Varieties.

Adrian.
Ameliaberta.
Beer's Late.
Beer's Smock.
Bokara.
Bokara No. 3.
Conkling.
Early Silver.
Emperor.
Ford Early.
Freehold.
Gibson's Late.
Gold Dust.
Good.
Goshawk.
Great Northern.
Haine's Early.
Hance's Golden.
Heath Cling.
Hyslop.
Kenrick's Heath.
Key Port White.
Levy's Late.
Lovett's White.
Magdala.
Mary's Choice.
Miller's Cling.
Mountain Rareripe.
Mrs. Brett.
Northern Apricot.
Orange Free.
Princess of Wales.
Red River.
Reed's Early Golden.
Shangai.
Surpass Melocoton.
Sneed.
Steadley.
Summer Snow.
Thurber.
Triumph.
Ward's Late.
Washington.
Yellow St. John.
Yeushi Hardy.

No. 2.—NIAGARA STATION.

Peaches.—45 Varieties.

Barnard.
Bokara No. 3.
Champion.
Conkling.
Crawford Late.
Crosby.
Early Canada.
Early Richmond.
Early York.
Elberta.
Fitzgerald.
Foster.
Garfield.
Globe.
Golden Drop.
Hales.
Hill's Chili.
Honest John.
Hortense Rivers.
Hyne's Surprise.
Jacques Rareripe.
Large Early York.
Lord Palmerston.
May's Choice.
Morris White.
Old Mixon Cling.
Old Mixon Free.
Ostrander's Late.
Red Cheek Melocoton.
Salway.
Schumaker.
Smock.
Steadley.
Steven's Rareripe.
Stump the World.
Susquehana.
Thurber.
Troth's Early.
Tyhurst.
Wager.
Waterloo.
Wheatland.
Wonderful.
Yellow Rareripe.
Yellow St. John.

Apricots.—10 Varieties.

Alberge de Montgamet.
Blenheim.
Breda.
Early Golden.
Early Moorpark.
Large Early Montgamet.
Luizet.
Montgamet.
Moorpark.
Peach.

Cherries.—14 Varieties.

Black Tartarian.
Downer's Late.
Dyehouse.
Early Richmond.
Early Purple.
Governor Wood.
Late Duke.
Mercer.
Montmorency.
Montmorency Ordinaire.
Napoleon.
Reine Hortense
Royal Duke.
Windsor.

MULBERRIES.—3 VARIETIES.

Downing.	New American.	Hick's Everbearing.

NECTARINES.—3 VARIETIES.

Boston.	Downton.	Early Violet.

NUTS (CHESTNUTS).—9 VARIETIES.

Alpha.	Giant.	Parry's Superb.
Beta.	Kentish Cob.	Ridgely.
Early Reliance.	Paragon.	Spanish.

PLUMS.—15 VARIETIES.

Abundance.	Hudson River Purple Egg.	Prince of Wales.
Burbank.	Japan.	Satsuma.
Czar.	Ogon.	Saunders.
Peter's Yellow Gage.	Grand Duke.	Spaulding.
Gueii.	Pond's Seedling.	Willard.

No. 3.—WENTWORTH STATION.

GRAPES.—14 VARIETIES.

Alice.	Cunningham.	Herbemont.
Beauty.	Excelsior.	Herman Jaegar.
Black Hawke	Faith.	Mason Seedling.
Black July.	Grein's No. 7.	Poughkeepsie Red.
Brilliant.	Hayes.	

CHERRIES.—1 VARIETY.

Mercer.

PLUMS.—1 VARIETY.

Monarch

No. 4.—BURLINGTON STATION.

BLACKBERRIES.—11 VARIETIES.

Bangor	Eldorado.	Stone's Early.
Child's Tree.	Humboldt.	Wilson Junior.
Dorchester.	Logan.	Wilson's Early.
Early King.	Maxwell.	

CURRANTS.—11 VARIETIES.

Belle de St. Giles.	North Star.	Victoria.
Black Victoria.	Red Cross.	White Grape.
Fays.	Raby Castle (Victoria).	White Imperial.
Lee's Prolific.	Versailles.	

GRAPES.—12 VARIETIES.

Agawam.	Green Mountain.	Northern Light.
Barry.	Lady.	Pocklington.
Brilliant.	Lindley.	Salem.
Catawba.	Massasoit.	Wilder.

NUTS.—1 VARIETY.

Giant chestnut.

PEARS.—19 VARIETIES.

Beurre d'Anjou.	Idaho.	Souvenir du Congres.
Beurre Bosc.	Josephine de Malines.	Sudduth.
Clairgeau.	Kieffer.	Summer Doyenne.
Clapp's Favorite.	Lawrence.	Vermont Beauty.
Doyenne Boussock.	Lawson.	Wilder.
Giffard.	Margaret.	Winter Nelis.
Howell.		

PLUMS.—18 VARIETIES.

Abundance.
Burbank.
Czar.
Fellemberg.
Grand Duke.
Gueii.
Hudson River Purple Egg.
Lincoln.
Moore's Arctic.
Peter's Yellow Gage.
Pond Seedling.
Prince of Wales.
Satsuma.
Saunders.
Shropshire Damson.
Spaulding.
Weaver.
Willard.

RASPBERRIES.—11 VARIETIES.

Columbian.
Gregg.
Japanese Wineberry.
Johnson Sweet.
Kansas.
Louden.
Lovett.
Ohio.
Onondaga.
Redfield.
Souhegan.

No. 5.—LAKE HURON STATION.

APPLES.—9 VARIETIES.

Alexander.
Blenheim.
Chenango.
Oldenburg.
Pewaukee.
Red Astracan.
Sutton Beauty.
Yellow Transparent.
Wealthy.

BLACKBERRIES.—3 VARIETIES.

Ancient Briton.
Child's Tree.
Stone's Hardy.

PLUMS.—1 VARIETY.

Field.

RASPBERRIES.—41 VARIETIES.

All Summer.
Brandywine.
Brinckle's Orange.
Caroline.
Columbian.
Cuthbert.
Gault.
Gladstone.
Golden Queen.
Gregg.
Hansell.
Hilborn.
Japanese Golden Mayberry.
Japanese Wineberry.
Johnston Sweet.
Kansas.
Lottie.
Louden.
Lovett.
Mammoth Cluster.
Marlboro'.
Maxwell.
Miller.
Ohio.
Ohmer.
Palmer.
Phœnix.
Progress.
Rancocas.
Redfield.
Reliance.
Royal Church.
Shaffer.
Smith's Giant.
Souhegan.
Strawberry Raspberry.
Superlative.
Thompson's Early.
Turner.
Tyler.
White Champlain.

No. 6.—GEORGIAN BAY STATION.

APPLES.—7 VARIETIES.

Blenheim.
Chenango Strawberry.
Cranberry Pippin.
LaRue.
McIntosh Red.
Ontario.
Sutton Beauty.

CHERRIES.—2 VARIETIES.

Montmorency Ordinaire.
Windsor.

PEACHES.—4 VARIETIES.

Crawford.
Crosby.
Smock.
Yellow St. John.

PEARS.—2 VARIETIES.

Dempsey.
Ritson.

GOOSEBERRIES.—4 VARIETIES.

Columbus.
Red Jacket.
Triumph.
Whitesmith.

PLUMS.—38 VARIETIES.

Admiral Rigney.	Gold.	Saratoga.
Bailey's Japan.	Golden Beauty.	Satsuma.
Belle de Septembre.	Grand Duke.	Snelling's Seedlings.
Brunswick.	Hammer.	Splendor.
Chas. Downing.	Kingston.	Stoddard.
Comfort.	Lafayette.	Tatge.
Communia.	Lincoln.	Whitby.
Copper.	Milton.	Whittaker.
Czar.	Orient.	Wickson.
Dunlop.	Pottawattamie.	Wolf.
Early Green.	Purple Reine Claude.	Yellow Japan.
French Damson.	Red June.	Young Ken's Golden.
General Brock.	Richland.	

RASPBERRIES.—4 VARIETIES.

Columbian.	Loudon.	Superlative.
Gault.		

No. 7.—SIMCOE STATION.

APPLES.—29 VARIETIES.

Arabka 257.	Gravenstein.	Russell.*
Barry.	Haskell Sweet.*	Scarlet Pippin.*
Cooper's Market.	Jersey Sweet.*	Shiawassee Beauty.*
Dominie.	Lady.*	Stump.*
Downing's Winter Maiden's Blush.	Lead.	Sylvan Sweet.
	Mother.	Vandevere.
Excelsior.	Ontario.	Winstead Pippin.
Fallawater.	Pastuchofka.	Winter Aport.
Florence.	Peck's Pleasant.	Yellow Newton Pippin.*
Good Pheasant.	Richland Golden Sweet.	Imperial York.

BLACKBERRIES.—3 VARIETIES.

Ancient Briton.	Eldorado.	Wilson Junior.

CHERRIES.—5 VARIETIES.

English Morello.	Lutovka.	Sklanka.
Latham.	Mercer.	

CURRANTS.—1 VARIETY.

Black Champion.

GOOSEBERRIES.—1 VARIETY

Columbus.

PEARS.—10 VARIETIES.

Beurre d'Anjou.	Giffard.	Lawrence.
Clairgeau.	Idaho.	Sudduth.
Doyenne Boussock.	Kieffer.	Wilder.
Easter Beurre.		

PLUMS.—8 VARIETIES.

Abundance.	Japan.	Shensi.
Botan.	Ogon.	Willard.
Burbank.	Satsuma.	

RASPBERRIES.—3 VARIETIES.

Hilborn.	Loudon.	Souhegan.

RUSSIAN APRICOTS.—6 VARIETIES.

Alexander.	Budd.	Nicolas.
Alexis.	Gibb.	Purple.

*Scions.

STRAWBERRIES.—6 VARIETIES.

Aroma.	Brandywine.	Marshall.
Beauty.	Hunn.	Wm. Belt.

No. 8.—EAST CENTRAL STATION.

APPLES.—37 VARIETIES.

Alexander.	Fameuse.	Shackleford.
America.	Gideon.	Salome.
American Pippin.	Gravenstein.	Stark.
Arkansas Red.	King.	Stump.
Baldwin.	LaRue.	Sutton Beauty.
Belle de Boskoop.	Longfield.	Tetofsky.
Ben Davis.	McIntosh Red.	Transparent.
Bethel.	Maiden's Blush.	Utter's Red.
Canada Red.	Mann.	Walbridge.
Cayuga Red Streak.	Newtown Pippin.	Wealthy.
Chenango Strawberry.	N. W. Greening.	Winesap.
Downing's Winter Maiden Blush.	Red Bietigheimer.	Wolf River.
Duchess.		

PEARS.—59 VARIETIES.

Angel.	Duchess de Bordeaux.	Madame Hemminway.
Bartlett.	Duchess Precoce.	Margaret.
Belle Lucrative.	Eastern Belle.	P. Barry.
B. S. Fox.	Fertility.	Pitmaston Duchess.
Bergamot Esperen.	Flemish Beauty.	President.
Beurre Bosc.	Fred Baudry.	President Druard.
Beurre Clairgeau.	Garber.	Ritson.
Beurre d'Anjou.	Goodale.	Rutter.
Beurre Hardy.	Idaho.	Seckel.
Charles Ernest.	Japan Golden Russet.	Seneca.
Clapp's Favorite.	Josephine de Malines.	Sheldon.
Comice.	Koonce.	Sudduth.
Compte de Chambord.	Kieffer.	Tyson.
Compte de Lambertye.	Krull.	Vermont Beauty.
Conference.	Lady Clapp.	Wilder.
Dempsey.	Lawrence.	Wilder Early.
Docteur Jules Guyot.	Le Lectier.	Winter Nelis.
Dorset.	Lincoln.	Worden Seckel.
Doyenne d'Ete.	Lincoln Coreless.	Zoe.
Duchess d'Angouleme.	Louise Bonne.	

NUTS.—ONE VARIETY.

Giant Chestnut.

RASPBERRIES.—1 VARIETY.

Columbian.

No. 9.—BAY OF QUINTE STATION.

APPLES—50 VARIETIES.

Arkansas Beauty.*	Flory.*	Scarlet Pippin.*
Barry.	Garfield.*	Springdale.*
Beauty of Bath.	Garden Gem.*	Walter Pease.
Beecher's Red Crab.*	Hamilton.*	Walbridge.
Bismarck.	Malinda.*	Western Beauty.
Boy's Delight *	Minkler.*	Wellington.
Carlough *	Mammoth Black Twig.	Winter Banana.*
Downing's Winter Maiden Blush.	Paragon.*	Winter Fameuse.*
Eicke.*	Parlin.*	York Imperial.*

Special Collection of apples from C. H. Shinn, A.B., Inspector of Exp. Station of University of California, Berkeley, Cal.

Ares Aphes.	Ingram.	Old Gold Ridge.
Benton Co. Beauty.	Isham.	Palouse.
Bush Seedling.	Landsberger.	Pioneer (Cal Seedling).
Duffey's Seedling.	Landsberger Reinette.	Pon Man's Fruit.
Green Cheese.	Malding.	Waren Pippin.
Graiel.	Nansemond Beauty.	Wharton.
H. Clay.	N. W. Greening.	Ukiah (Seedling).

NUTS.—1 VARIETY.

Giant Chestnut.

* Scions.

No. 10.—ST. LAWRENCE STATION.

Apples.—36 Varieties.

Alexander.
Blenheim Pippin.
Blunt.
Brockville.
Canada Baldwin.
Chenango Strawberry.
Downing's Winter Maiden Blush.
Enormous.
Gideon.
Golden Russet.
Hamilton.
Hibernal.
Hurlburt.
Late Strawberry.
Longfield.
McIntosh Red.
McMahon.
Magog Red.
Mathews.
Milwaukee.
Montreal Beauty.
N. W. Greening.
Ontario.
Peter.
Pewaukee.
Red Astracan.
Rochelle.
Roman Stem.
Salome.
Starr.
Sutton Beauty.
Whitney No. 20.
Windsor Chief.
Winter St. Lawrence.
Wolf River.
Yellow Transparent.

Pears.—20 Varieties.

Bergamot.
Bessemianka.
Beurre Clairgeau.
Beurre Hardy.
Clapp's Favorite.
Dempsey.
Early Bergamot.
Flemish Beauty.
Golden Russet.
Goodale.
Howell.
Idaho.
Keiffer.
Lincoln.
Lincoln Coreless.
Ritson.
Sudduth.
Varonesh.
Victorina.

Plums.—15 Varieties.

Chas. Downing
Comfort.
Communia.
Hammer.
Hughes
Lincoln.
Lombard.
Milton.
Montreal.
Moore's Arctic.
Pond Seedling.
Saunders.
Tatge.
Weaver.
Whittaker.

Raspberries.—1 Variety.

Columbian.

Strawberries—12 Varieties.

Aroma.
Beauty.
Bell.
Brandywine.
Bubach.
Greenville.
Hayfield.
Haverland.
Marshall.
Saunders.
Wm. Belt.
Woolverton.

No. 11.—STRAWBERRY SUB-STATION.

Strawberries.—41 Varieties.

Anna Kennedy (P).
Annie Laurie (S).
Apache (S).
Bismarck (S).
Champion of England (S).
Eleanor (S).
Erie (S).
Evans.
Glen Mary (S).
Hayden.
Holland (P).
Homestead.
Hull's No. 9.
Hull's No. 10.
Hunn (P).
Ideal (S).
Jarabolo (S).
Lincoln (P).
Maredian.
Maytrott's.
Michigan (S).
Naomi.
Noble.
No. 1000.
Ocean City (S).
Oriole (P).
Premium (P).
Ridgeway (S).
Satisfaction (S).
Sawlog (P).
Seedling A (Cooper's).
Seedling B "
Seedling C "
Seedling E "
Sparta.
Staples (S).
Sunrise (P).
Tubb's (S).
Warfield No. 4 (P).
World's Champion.
Zula (S).

No 12.—GOOSEBERRY SUB-STATION.

Gooseberries.—56 Varieties.

Alice Hawthorn.
Belle de Meaux.
Broomgirl.
Candidate.
Cook's Eagle.
Criterion.
Crown Bob.
Dublin.
Early Oldham.
Early Rough Red.
Early Smooth Red.
General.
Green Chisel.
Green Rover.
Gunner.
Ingram's Ocean.
Ironmonger.
Jumbo.
Keen's Seedling.
Lady Leceister.
Lanceolet.
Lofty.
London.
Lord Crewe.
Mabel Morrison.
Madame Lefort.
Magistrate.
Magnet.
Major Oldham.
Monarch.
Napoleon the Grand.
Oldham.
Oregon.
Overall.
Printer.
Queen Victoria.
Railway.
Random.
Red Champagne.
Red Robin.
Roaring Lion.
Snowball.
Snowdrift.
Snowdrop.
Souvenir de Billard.
Success.
Swan.
Top Gallant.
Triumph.
Turkey.
Walnut
Warrington.
White Champagne.
Whitesmith.
Winham's Industry.
Yellow Champagne.

No. 13.—MAPLEHURST CHERRY STATION AND GENERAL COLLECTION FOR DESCRIPTIVE WORK.

Apricots.—7 Varieties.

Bougome.
Hubbard.
Montgamet.
Peach.
Royal.
Shensi.

Grapes.—24 Varieties.

Alice.
Barry.
Beauty.
Black Hawk.
Colerain.
Eaton.
Elvira.
Esther.
Gaertner.
Geneva.
Golden Drop.
Grein's No. 7.
Herbert.
Hayes.
Massasoit.
Merrimac.
Moore's Diamond.
Moyer.
Norton's Virginia.
Peabody.
Rebecca.
Rochester.
Rockwood.
Senasqua.

Mulberries—1 Variety.

Downing.

Nuts (Chestnuts).—4 Varieties.

Alpha.
Beta.
Giant.
Parry's Superb.

Cherries.—19 Varieties.

Abbesse.
Black Tartarian Improved.
California Advance.
Centennial.
Dyehouse.
Early la Maurie.
Hortense.
Ida.
Mercer.
Murdoch's Bigarreau.
Ostheimer.
Plymouth Rock.
Purity.
Rocky Mountain.
Royal Blue.
Sparhawk.
Suda Harvey.
Windsor.
Wragg.

Pears.—13 Varieties.

Beurre Clairgeau.
Clapp's Favorite (dwarf).
Fred Beaudry.
Garber.
Giffard.
Koonce.
Krull.
Pitmaston Duchess.
Pound.
President Mas.
Directeur Alphande.
Rutter.
Sudduth.
Wilder.

Plums.—15 Varieties.

Belle de Septembre.
Dunlap.
Goliath.
Ickworth Imperatrice.
Kingston.
Lafayette.
Lucombe's Nonsuch.
McLaughlin Orange.
Oullin's Golden.
Prune d'Agen.
Reine Claude Violette.
Royal Hative.
Transparent.
Wagenheim.
Young Ken's Golden.

QUINCES.—4 VARIETIES.

Bourgeat Early.
Fuller.
La Maurce.
Van Deman.

SHRUBS.—11 VARIETIES.

Amur Barberry.
Amur Tamaris.
Chinese Barberry.
Douglassii.
L'Alberti.
Lonicera splendens.
L'Xylosteum.
Nobleana.
Russian Snowball.
Spiræa tribola.
Viburnum lantara.

The Secretary also reported that he had secured from the Minister of Agriculture permission to use such bottles as were needed by the Board, and had proceeded during the summer to put up a selection of varieties of cherries and other fruits in preserving fluids for exhibition purposes He had also secured a selection of strawberries and other fruits from Mr. E. B Stevenson, a few varieties of plums from Mr. John Mitchell, and some peaches from Mr. W. W. Hilborn.

This collection he had exhibited at the Industrial, being personally present to superintend it, as well as the exhibits of green fruits from the various stations. The Secretary presented the following report of the same :

THE FRUIT EXHIBIT AT THE INDUSTRIAL FAIR, TORONTO.

In accordance with the instructions of the Board of Control, your Secretary conferred with the Minister of Agriculture concerning the use of the bottles used at the World's Fair, for putting up a fresh exhibit of early perishable fruits for the Experiment Station exhibit at the Industrial. With his permission the Secretary proceeded to put up in chemicals early fruits, especially cherries, berries, peaches and plums. One dozen varieties of peaches were furnished from the North Western Station, one dozen varieties of plums from the Georgian Bay Station, thirty varieties of strawberries from the strawberry station at Guelph, some raspberries and blackberries from the Burlington Station, and the balance, to make up a total of over 150 bottles, were furnished by the Secretary.

During the first week of the exhibition the Secretary had this exhibit set in the Fruit Building at the Industrial, after having shelves built for the purpose, and was in attendance from Monday until Saturday of the second week to superintend the exhibit of fresh fruits from the various stations. In the case of the exhibit he secured especial assistance from A. M Smith, W. H. Dempsey, Rev. E. B. Stevenson and H. L. Hutt. The exhibit consisted of :

	Varieties.
Bottled fruit	150
Apples, from Bay of Quinte Station	127
" St. Lawrence "	9
" Simcoe "	36
" Lake Huron "	33
" East Central "	35
Pears, from " "	33
Grapes, from Wentworth "	100
Peaches, from South Western "	25

Signs and placards were secured in order to explain the object of the exhibit, and attract notice ; and probably no part of the Fruit Building was more crowded than that part containing the exhibit of the Fruit Experiment Stations, and more especially the bottled fruit. This latter was loaned to the O. A. C. at Guelph for use in illustrating lectures in the classes in Horticulture.

SPRAYING EXPERIMENTS.

Mr. W. M. Orr, of Fruitland, Provincial Superintendent of Spraying Experiments, was present and gave a verbal report of his work, with some extracts from his written report. This report will be appended hereto, and published in detail. Mr. Orr explained that he had conducted these experiments in twenty-nine different points, and given six applications in each case. Fungus diseases had not been as widespread as usual in the year 1896, and yet there was a very evident difference between the trees sprayed and unsprayed, both with regard to foliage and fruit, as had been proved by careful count.

The Board agreed to suggest that if spraying experiments are to be continued in 1897, it might be well to ask experimenter to undertake some additional lines of work, in which treatment with kerosene emulsion would be required.

Mr. Hutt then read a full report of his visits of inspection to the various stations during 1896, and it was ordered that his paper be included in the annual report of this Board.

INSPECTION OF FRUIT EXPERIMENT STATIONS.

By H. L. Hutt, Official Visitor.

It was my pleasant duty during the summer to pay a visit of inspection to each of the Fruit Experiment stations now established, and it gives me pleasure to report that great progress has been made in the work since last year.

In my last report I dealt at some length upon the location and size of each station, the kinds of fruit-growing there, and the fitness of the men for carrying on experimental work. As all this need not be repeated, my report this year may be made considerably briefer and will treat more particularly of the additional planting that has been done and of the management of the work. A few notes were also taken as to the fruit crop at the various stations, and each experimenter was asked to give a short list of the varieties which from his past experience he would plant, if planting again for profit. These lists will be helpful as guides to intending planters, although in some cases they will, no doubt, be considerably changed when the newer varieties now under test come into bearing.

I shall speak of each station briefly in the order in which they were visited:

The Southwestern Station.

Visited on August 25th, 1896.—Mr. Hilborn has now in his orchard about 150 varieties of peaches, 50 varieties, three trees of each, having been added last spring. About 30 varieties were in bearing this year and will be described in his report. About as many more are expected to begin bearing next year. There were very few failures in this years's planting, and nearly all of the trees of both this year's and last year's planting have made a remarkably fine growth.

There are also thrifty young trees of 25 varieties of plums, 20 of cherries and 12 of apricots, which he will be able to report on as they come into bearing. The cherry trees this year were badly infested with the pear slug (*Selandria cerasi*). Both broods of this insect were unusually plentiful this year, and in spite of repeated applications of air slaked lime, did considerable damage to the foliage.

On account of the comparative failure with strawberries on his light, dry land for the past two seasons, Mr. Hilborn has thought best to give up growing this fruit until a moister or more suitable piece of land can be cleared up for the purpose.

Mr. Hilborn's orchards receive thorough cultivation up till the middle of August, and the fine growth his trees have made shows that he thoroughly understands their management. When questioned as to his choice of half a dozen varieties, Mr. Hilborn said he would not like to confine himself to so short a list, but if compelled to do so would select Early St. John, Early Crawford, Elberta, Late Crawford, Lemon and Smock. These varieties, early and late, as nearly as possible extend over the peach season.

As far as I could learn by visiting a number of peach orchards no true case of "peach yellows" has as yet appeared in this section. The majority of growers are very wisely on the watch for it, and are ready to pull up and burn any tree that looks at all suspicious.

The increase in value of peach lands in this section of late years rivals the boom in Rossland. The bare land, which six years ago could be bought for $85 per acre, is now selling for $150 per acre, while the same land planted with peach trees four years old is being held at $325 per acre.

The peach crop in this section this year was perhaps larger than ever, and good fruit was selling at from 60c to 75c per 12 quart basket. Strange to say Mr. Hilborn was getting his highest prices in the Hamilton market.

As an evidence that peach growing must pay in Essex, Mr. Hilborn is building a new house, which, when completed, will compare favorably with some of the stately residences of Grimsby fruit growers.

The Lake Huron Station.

Visited on August 27th, 1896.—The additional planting done at this station this year was as follows : 14 varieties of apples, all of which have lived and made a good growth ; 8 varieties of plums ; 6 varieties of cherries ; 5 varieties of blackberries ; 15 varieties black raspberries, and 20 varieties of red raspberries. With one or two exceptions nearly all of the trees have lived and made a good growth, and whatever spaces occur among the raspberries will be filled in the spring with plants propagated from those now growing.

All of the trees and plants have been well taken care of and have been neatly labelled.

Half of the bearing apple orchard, which was last year in sod, has been broken up and kept well cultivated. The marked difference on this half, in comparison with that on the uncultivated half, was enough to convince the most sceptical of the benefits of good cultivation in an apple orchard.

As in all other parts of the country the apple crop in this section was unusually large. The Ben Davis, Golden Russet, Mann and Fameuse in Mr. Sherrington's orchard were very heavily loaded.

A plot of 2½ acres adjoining Mr. Sherrington's has been purchased and will be cleared up and put in condition for further experimental planting.

The Georgian Bay Station.

Visited on August 28th, 1896.—Mr. Mitchell has a very fine orchard of plums, about four acres in extent, in full bearing. This contains 18 varieties which will be reported on from year to year. Thirty-five varieties, three trees of each, were added last year and 55 varieties more were added this year. When these all come into bearing some valuable information for plum growers may be looked for from this station.

What few trees have failed in this year's planting will be replaced by others in the spring. With the good care given them all of the trees living have made a very fine growth.

Among the varieties which Mr. Mitchell recommends for profit from his present experience are : Lombard, Glass' Seedling, Pond's Seedling, Coe's Golden Drop, Early Black Damson, Quackenboss, Washington, Bradshaw and Reine Claude.

Those varieties bearing the heaviest crop this year were : Damsom, Lombard, Yellow Gage, Quackenboss, Glass' Seedling and Reine Claude.

In addition to the plums Mr. Mitchell is trying a dozen varieties of pears, and a half-dozen of the hardiest varieties of peaches.

His apple orchard was bearing heavily. Those varieties carrying the greatest load were: Ben Davis, Golden Russet, Ribston Pippin, Pewaukee, Gravenstein, King, St. Lawrence, and Fameuse.

The Simcoe Station.

Visited on August 29th, 1896.—Considerable progress has been made in the work at this station. In addition to the 25 varieties of apples which Mr. Caston had in bearing, about 40 varieties were planted last year, and 16 varieties more were added this year. A number of other fruits are also being grown at this station to test their hardiness.

The additional planting this year consisted of 5 varieties of pears, 6 of plums, 5 of Russian apricots, 4 of blackberries, 5 of raspberries, and 6 of strawberries.

Great care had been taken in planting and very few of the trees or plants had failed. They had been well cultivated during the season and showed a good strong growth.

Mr. Caston has everything neatly labelled, and has made a map of his orchards, so that any variety under test may be readily located.

In Mr. Caston's bearing orchard the varieties most heavily loaded were Duchess of Oldenburg, Wealthy, Fameuse, Ben Davis, Golden Russet, Pewaukee and La Rue. The Duchess Mr. Caston finds to be one of his most profitable varieties. Sixty barrels of this variety were sold to customers about North Bay for $1.25 per barrel.

The following varieties are recommended for profit in this section: Summer—Duchess of Oldenburg; Autumn—Wealthy and Alexander; Winter—Fallawater, Mann, Bottle Greening, Northern Spy, King of Tompkins and Baldwin. These last three Mr. Caston prefers to be top grafted on Talman Sweets.

Bay of Quinte Station.

Visited on September 16th, 1896.—Over 150 varieties of apples have been under test at this station for some time. Ten new varieties, three trees of each, were planted this year, and the scions of 33 varieties were grafted into bearing trees. Twenty-five trees of Talman Sweets were planted this year for stocks on which to top graft new varieties which may be sent here for trial.

Mr. Dempsey's large orchard of 40 acres is well cared for, and is well worth seeing at any time. He manages to have half of his trees bearing one year and the other half the next, and in this way he has a fair crop to handle every year. His crop last year was about 1,800 barrels and he estimated the crop this year at 2,000 barrels.

Mr. Dempsey is a careful packer and successful shipper. His entire crop last year averaged $2.40 per barrel, most of them being sold right at his packing house during the winter.

Out of his long list of varieties under test he recommends the following for profit: Summer—Duchess of Oldenburg; Autumn—Trenton, Wealthy and Fameuse; Winter—Gravenstein, Blenheim Orange, Ontario, Ben Davis and Stark.

The St. Lawrence Station.

Visited on September 17th, 1896.—The plot of ground at this station devoted to the experimental planting is four acres in extent, sloping gently to the St. Lawrence River. It was planted this year with 36 varieties of apples, 16 of pears, and 15 of plums, three trees of each variety. Some few trees from American nurseries died, but all those from Canadian nurseries lived, and all of the trees living made a good growth. The spaces between the trees were planted with corn and potatoes and kept well cultivated. Care was also taken to prevent the attack of the pear slug, which has done so much damage to trees in other places.

Mr. Jones has all the new trees neatly labelled and has made a good map of the orchard with each variety properly located.

In his bearing orchard there was a fine crop of clean fruits, probably 500 barrels, made up mostly of Fameuse and Scarlet Pippin, a local variety of great beauty and promise.

By persistent spraying with kerosene emulsion, Mr Jones has succeeded in ridding his orchard of the Cigar Case-bearer (*Coleophora Fletcherella*) which of late years has done so much damage in that section.

The East Central Station.

Visited on September 18th, 1896.—The additional planting at this station this year was three trees each of twenty-three varieties of apples, and twenty-nine varieties of pears. Ten varieties of French pear trees, too small for planting, were put into a nursery row for another year. There were very few failures among the trees planted and most of them made a very good growth. The land between the trees was cropped with corn and kept well cultivated.

A record has been made of the planting, and the trees well labelled with zinc labels, as has been advised at all stations where this has not yet been done.

A considerable part of Mr. Huggard's orchard is in sod and the rest of it cropped with grain and roots—not what we consider the best treatment for an orchard, but he intends to break up the sod and give the whole orchard clean cultivation.

The following is a list of the varieties of apples he recommends for planting in that section: Summer—Yellow Transparent and Duchess of Oldenburg. Autumn—Fameuse and Wealthy. Winter—Northern Spy, Baldwin, Rhode Island Greening, and Red Canada.

The varieties of pears recommended are as follows: Bartlett, Flemish Beauty, Beurré Clairgeau, Louise Bonne, Belle Lucrative, Goodale, and Keiffer.

The Burlington Station.

Visited on September 19th, 1896. This station is the centre of a very fine fruit section, and is well stocked with a large number of varieties of most kinds of fruit grown in Ontario.

The additional planting this year consisted of 20 varieties of blackberries and raspberries; 14 of currants; 7 of grapes; 18 of plums; and 20 of pears.

Mr. Peart is a first class fruit grower, and gives his orchards and fruit plantations the best of care. Under his good management there were very few failures among the fruits planted this year, and all living have made a remarkably fine growth.

The fruit crop here this year was not only large but of fine quality. From his own experience with what fruits he has in bearing, Mr. Peart recommends the following varieties for profit in this section:

Plums.—Of which he has 1,000 trees of 20 varieties in bearing: Lombard, Reine Claude, Washington, Imperial Gage, Yellow Egg, Glass' Seedling, and Quackenboss.

Pears.—Bartlett, Duchess, d'Angoulême (on dwarf stock), Beurré d'Anjou, and Clapp's Favorite.

Grapes.—Black—Concord and Worden. Red—Vergennes, Lindley, and Wyoming Red. White—Moore's Diamond.

Apples.—Duchess of Oldenburg, Ribston Pippin, Baldwin, Rhode Island Greening, and Northern Spy.

Blackberries.—Snyder and Western Triumph.

The Niagara Station.

Visited on September 27th, 1896. At this station, too, we have quite a list of varieties of a number of different kinds of fruits already in bearing. The additional planting was mostly of those kinds which have been considered more or less tender in this Province; the object being to find out what varieties may be profitably grown in the southern parts of the Province. Last spring's planting consisted of three trees each of the following: 50 varieties of peaches; 15 of cherries; 12 of plums; 8 of apricots; 3 of nectarines; 3 of mulberries; 10 of Japan chestnuts; and 1 of filberts.

Some few of the chestnuts and sweet cherries failed to grow, the stock being in poor condition when received. With the good care given them the greater part of the trees have done well, some kinds having made a very strong growth. Under Mr. Burrell's management they will have every chance possible. It remains to be seen how some of them will stand our climate.

A careful record has been made of the planting, and the trees will be labelled this fall with zinc labels.

If growing for profit, Mr. Burrell says he would plant the following varieties:

Peaches.—Early Rivers, Yellow St. John, Reeve's Favorite, Oldmixon, Steven's Rareripe, and Smock.

Cherries.—Sour—Early Richmond, Montmorency, and May Duke. Sweet—Knight's Early Black, Black Tartarian, and Windsor.

Pears.—Clapp's Favorite, Bartlett, Tyson, Beurré d'Anjou, Beurré Bosc, and Keiffer.

Plums.—Prince's Yellow Gage, Niagara, Bradshaw, Lombard, Washington, Coe's Golden Drop, and Reine Claude.

Grapes.—Black—Worden, Concord, and Herbert (Roger's 44). Red—Lindley, Agawam, and Vergennes. White—Niagara.

The Wentworth Station.

Visited on September 29th, 1896. In the large vineyards at this station there are about 80 varieties of grapes in full bearing; 28 additional varieties were planted last year, and 14 more this year. The young vines put out last year have made a strong growth and will be trellised next spring. Some of them bore a few bunches of fruit this year. The plum, cherry, and pear trees also planted last year have made a good growth.

All trees and vines have been neatly labelled with zinc labels.

Mr. Pettit is a thorough going fruit grower and gives his vineyards and orchards the best of care. His bearing vineyard this year was as heavily loaded as ever.

From his long list of varieties of grapes he would select the following as the most profitable: Black—Worden, Wilder, and Concord. Red—Lindley, Agawam, Delaware, and Catawba. White—Niagara, and Moore's Diamond.

Mr. Pettit has an extensive pear orchard in full bearing. He mentions the following varieties for profit, named in the order of ripening: Beurré Giffard, Bartlett, Flemish Beauty, Duchess d'Angoulême, and Keiffer.

Out of ten varieties of plums in bearing, the following are the choice for profit: Lombard, Washington, Bradshaw, Yellow Egg, and Reine Claude.

Strawberry Sub-Station.

This has been called the Halton sub-station because Mr. Stevenson is now located at Freeman, in Halton Co. His experimental grounds, however, are on the fruit farm of his father, near Guelph, which he visits frequently. I have had occasion to visit these grounds at different times during the season, and know that they contain much of interest to strawberry growers.

Mr. Stevenson knows not only how to grow strawberries successfully, but how to give a complete and intelligent report on them. In his last year's report, he carefully describes 90 varieties under test. Sixty-six new varities were fruiting with him this year for the first time.

Gooseberry Sub-Station.

On account of experimental work at the College which required my close attention during the small-fruit season, I was unable this year to visit our gooseberry station in Simcoe, managed by Mr. Stanley Spillet. Mr. Woolverton, our Secretary, found time to do so, however, and judging from his reports, as well as from my own observations on previous visits, I believe good work is being done and valuable reports may be looked for from this station.

The Secretary then proceeded to read his descriptive work on the "Fruits of Ontario," and invited careful criticism of the work by the members of the board. It was ordered that this report be adopted, and included in the report of the fruit experiment stations. This report appears on pages 1 to 40.

The annual reports from the various stations were then taken up and read by the Secretary. The balance of the salary for 1896 was ordered paid to those whose reports were received; and the delinquents were notified that their reports must be sent in by the 15th of November in future, in accordance with the terms of the agreement.

It was further resolved that the attention of all the experimenters be called to the importance of filling the station record blanks in dealing with the yield of the various fruits under various conditions.

REPORTS FROM THE STATIONS.

These will be classified as follows, for convenience of reference: Apples, pears, plums, peaches, cherries, grapes, currants, gooseberries, blackberries, raspberries, strawberries.

APPLES.—BAY OF QUINTE

W. H. Dempsey, Trenton,

Size.—S., Small, less than 1½ inches in diameter; M., Medium, 1½ to 3½ inches in diameter; L., Large,
Form.—An. Angular; Con., Conical; Cor., Corrugated; Ob., Oblate; Cbl., Oblong; Obt., Obtuse;
Color.—B., Brown; Bh., Brownish; Bl., Blush; Blo., Bloom; Br., Bright; G., Green; Gh.; Greenish; Reddish; Rus., Russet; Sp., Splashed or Splashes; Str., Striped; Sun, on
Cavity.—S., Shallow; N., Narrow; D., Deep; B., Broad.

Variety.	Origin.	Fruit.		
		Size.	Form.	Skin. Color.
Fall Pippin	United States	L	rh. obt	yh. g., often with bh. bl., many w. dots in sun.
Golden Sweet	Connecticut	M	rh ov	pale yel
Golden White	Russia	L	ov., unevenly ribbed.	rh. yel., nearly covered by pa. r. sp. and str. with deeper red.
Gravenstein	Gravenstein in Holstein, Germany.	M	ob an	br. red well str. and sp. r. and o.
Hubbardston Nonsuch.	Hubbardston, Mas.	M	r ov	y. nearly covered with broken stripes and nu. dots of light r.
Munson Sweet	Uncertain probably Massachusetts.	M	ob	y. with a b. bl. in sun
McIntosh Red	John McIntosh, Dundela, Ont.	M	rh ob	y., nearly covered with dark r., alp. in sun.
Mann	Judge Mooney, Granby, N.Y.	M	rh ob	y. with b. r. sun, and nu. light g. dots.
Pewaukee	Seedling of Duchess by Geo. P. Pepper, of Pewaukee, Wis.	M-L	ov	y. str., spl. with light and dark r., numerous g. dots covered with a grayish bloom.
Plumb's Cider	Uncertain, introduced by J. C. Plumb, Milton, Wiss.	M	obl. ov	gh. y. shaded and spl., str. with r., a few light dots.
Rhode Island Greening.	American	M	rh. ob	g., becoming greenish y., dull b., bl. in sun.
Roxbury Russet	Massachusetts	M	rh. ob	g., partly covered with rus
Ribston Pippin*	Ribston Hall, near Knaresborough, Eng.	M	rh. con	y., nearly covered with broken streaks and stripes of r., sometimes quite rus.
Stuart's Golden	Wm. Stuart, Rush Creek, O.	M	ob	bright y., little brown and w. dots.
Sops of Wine	English	M	rh	y. spl. and shaded with deep r., nu. w. and g. dots.

* Supposed to have been one of a number of seeds from Rouen, and planted at Ribston Hall 1688, and

EXPERIMENT STATION.—1896.

EXPERIMENTER.

over 3½ inches in diameter.

Ov., Ovate; R., Round; Rh., Roundish; Rib., Ribbed.

Nu., Numerous; O., Orange; P.o., Pale Orange; P., Purple; Ph., Purplish; Pa., Pale; R., Red; Rh., sunny side; W., White; Wh., Whitish; Y., Yellow; Yh., Yellowish.

	Fruit.							
						Flesh.		
Cavity.	Stem.	Basin.	Calyx.	Weight.	Core.	Color.	Texture.	Flavor.
D	3¼ in., heavy.	round, deep.	open ...	3½ oz...	conical..	white ..	tender, mellow	rich aromatic.
D	1 to 1½ in	deep ...	closed ..	3 oz....	ovate...	y. white	tender.	sweet ....
S	1 to 1¼ in	rib. deep	open ...	3 oz....	ovate...	white, streaked with red	tender, crisp, coarse grain.	sub-acid.
D	3¼ to 1 in heavy	wide, deep	closed ..	3 oz....	conical..	white .	tender, crisp, juicy....	rich, agreeable, aromatic.
ND	¾ inch ..	ribbed..	open ..	3 oz....	ovate...	.....	tender, juicy	slightly sub-acid.
BD	¾ inch ..	small ..	closed ..	2½ oz...	oblate .	yel. w..	tender	sweet.
S	¾ inch ..	small ..	closed ..	2½ oz...	ovate. .	white ..	very tender	mild, sub-acid.
D	½ to in	large ..	closed ..	3 oz....	oblate .	yel. w..	crisp	sub-acid.
S	½ in only not often	medium	closed ..	3½ oz...	small, ovate	white ..	breaking tender	juicy, sub-acid, aromatic.
SN	½ inch..	small, cor.	closed ..	2¾ oz...	large, ov	gh. w...	tender	mild sub-acid.
D	¾ inch..	small, cor.	closed ..	3 oz....	oblate..	yellow..	tender, juicy, crisp....	sub-acid.
S	½, ¾ in..	round ..	closed ..	3 oz...	oblate .	gh. w...	crisp	sub-acid.
B	½ to ½ in	irregular.	closed ..	2½ oz...	ovate...	yellow..	firm, crisp.....	rich aromatic.
S	½ inch, small.	broad ..	closed ..	2 oz....	small, ovate.	w. y....	tender, juicy..... ...	pleasant, sub-acid.
N	1 inch, slender	shallow.	closed ..	2½ oz...	ovate...	w. with streaks red.	tender.....	pleasant, sub-acid.

planted in the Park. The original tree stood till 1810, when blown down; propped up; lingered till 1835.

COMMERCIAL

EAST CENTRAL STATION RECORD.—

Variety.	When planted	Soil.	Cultivation.	Fertilizers used.	Date of pruning.	Name.
Astrachan	1876	Clay loam	meadow	coal ashes	Mch. '96	bark lice codling moth.
Early Harvest	1876	"	cultivated	stable manure	"	"
Duchess of Oldenburg	1880	"	meadow	coal ashes	"	"
Kentish Fillbasket	1879	"	"	"	"	"
Chenango Strawberry	1884	"	"	"	"	"
Wealthy	1886	"	cultivated	manure and ashes.	"	"
Haas	1876	"	"	manure	"	"
Twenty Ounce Pippin	1876	"	meadow	coal ashes	"	"
Fameuse, Snow	1876	"	"	"	"	"
Grime's Golden	1876	"	cultivated	stable manure	"	"
Fall Pippin	1876	"	"	"	"	"
Holland Pippin	1876	"	"	"	"	"
Ribston Pippin	1880	"	"	"	"	"
Boston Star	1876	"	meadow and cultivated	coal ashes and manure.	"	"
Belle Fleur	1876	"	cultivated	manure	"	and tent caterpillar
American Golden Russet	1876	"	meadow	coal ashes	Spg. '96	codling moth and bark lice.
Swazie Pomme Gris	1879	"	"	"	"	"
Princess Louise	1888	"	"	"	"	"
Rhode Island Greening	1876	"	"	"	"	tent caterpillar
Baldwin	1876	"	"	"	"	moth and lice.
Northern Spy	1876	"	"	"	"	"
Wagner	1876	"	"	"	"	"
Salome	1889	"	"	"	"	"
Blue Pearmain	1884	"	cultivated	manure	"	"
Tolman Sweet	1876	"	"	"	"	"
Swaar	1888	"	meadow	ashes	"	"
Minkler	1879	"	"	"	"	"
Pewaukee	1880	"	"	"	"	"
Canada Red	1880	"	"	"	"	"
Ontario	1880	"	"	"	"	"

APPLES.

R. L. HUGGARD, WHITBY, EXPERIMENTER.

Insects. Treatment.	Date of maturity.	Date of gathering.	Yield.	Grade. Class 1.	Class 2.	Class 3.	Place of storage.	Date of decay.	Average price.
			bbls	bu.	bu.	bu.			bb .
ash lye and Bordeaux mixture.	Aug.	Aug. 16....	2	60	40	....	barn cellar....	Sept. 20..	$1 50
"	July and Aug.	" 1....	1½	50	20	30	"	" 20..	1 00
"	Aug. and Sept	Sept. 1 ...	2	60	20	20	"	.....	1 25
"	Sept	" 12....	1	60	40	...	"	.....	.....
"	.....	.....	1½	75	25	. ..	"	Nov. 1..	50
"	....	Sept. 3....	2	40	60	....	"	.....	not sold
"	....	" 17....	4	50	50	...	"	.....	"
"	Oct. to Jan ..	.....	½	80	20	....	"	.....	"
"	" ..	Sept. 18....	3	75	20	5	"	.....	"
"	Dec. to Mch..	" 20....	1	90	10	....	" ...	.....	"
"	Oct. to Jan ..	" 16....	1½	40	60	....	"	.....	"
"	Aug. to Nov .	" 21....	1	80	20	....	"	....	"
"	Nov. to Apl..	" 8....	3	75	25	....	"	.....	"
"	Oct. to Dec ..	" 19....	3	70	30	....	"	.....	"
"	Dec. to Feb ..	Oct. 6....	4	60	10	30	"	....	"
"	Dec. to May..	" 3....	1½	70	30	....	"	.....	"
"	Jan. to May.	" 6....	1	80	20	....	house cellar ..	.....	"
"	Dec. to Feb ..	Sept. 15 ...	1	70	30	....	barn cellar....	... .	"
"	" ..	Oct. 1....	3	60	30	10	"	.....	"
"	Jan. to Apl ..	" 8 and 9.	2½	70	30	....	"	.....	"
"	" ..	" 16 and 17	1½	60	40	....	house cellar ..	.....	"
"	Nov. to Feb..	" 9....	1	60	30	10	barn cellar....	.....	"
"	Jan. to May..	" 17....	*	....	....	....	.....	.....	.....
"	Dec. to Mch..	" 1....	1	50	30	20	barn cellar ..	.....	not sold
"	Nov. to Apl..	" 17....	2	60	20	20	house cellar ..	.....	"
"	Dec. to Mch..	" 10....	½	70	30	....	barn cellar....	.....	"
"	Dec. to Apl ..	" 5....	1	90	10	....	"	.....	"
"	Jan. to Apl ..	" 17	2	80	10	10	"	.....	"
"	Dec. to Apl ..	" 12 ...	2	90	10	....	"	.....	"
"	Jan. to May..	" 12....	1½	80	20	....	"	.....	"

*Have only one tree, only few on, all good.

APPLES.—TESTED AT EAST CEN-

R. L. Huggard,

Habit.—S., Spreading ; U., Upright ; D., Drooping. Size.—S., Small, less than 1½ inches
Cavity.—S., shallow ; N., Narrow ;

Variety.	Origin.	Tree.		Fruit.			
		Habit.	Age of bearing.	Size.	Form.	Color of skin.	Cavity
Blue Pearmain		S	5	L	round, obl	bluish red, yellow spots	SN
Boston Star	American	U S	7	L	roundish..	greenish yellow	S
Chenango Strawber'y	Lebanon, N.Y.	S	2	M L	obl. con ..	yellow with red strip..	N D
Early Harvest	American	U S	6	S M	roundish..	yellow	S
Holland Pippin	American	U S	10	L	roundish..	greenish yellow	D
Kentish Fillbasket..	English	U S	10	L	roundish .	white with red cheek..	S
Minkler	Illinois	U S	7	M	r. conical.	green and r. light spots	SN
Princess Louise	Canadian	U	7	M	r. conical.	yellow, with very red cheek	D
Salome	Ottawa, Ill	S	6	M	r. conical.	yellow and red	N D
Swaar	American	U S	9	L	r. obl	greenish yellow	S

APPLES.—TESTED AT SIMCOE

G. C. Caston,

Bogdanoff	Russian	S	4	M	r. oblate..	green, splashed and shaded with dull red.	D B
Hare Pipka	Russian		6	L	conical ..	red	M
Kean's Seedling	Seedling of Duchess, at Orillia.	S	4	M L	r. oblate..	streaked and splashed with red.	M

APPLES.—TESTED AT St.

Harold Jones,

Brockville Beauty...	County Leeds, Ont., near Lyn.	S	.....	M	obl. con ..	white, splashed and streaked with bright red.	S N
Scarlet Pippin	Seedling on the Caldwell Farm, Co. Leeds, near Brockville.	U	.....	M	oblate....	white, nearly covered with bright red and deep crimson in sun.	S

APPLES.—TESTED AT HURON

A. E. Sherrington,

Colvert		S	.....	M L	R. oblong	greenish yellow, splashed with red.	B D
Lowell Pippin		S	.....	L	conical ..	yellow	N
Rambo	America	U	.....	M	.. oblong	yellow, streaked with red.	S

RAL EXPERIMENT STATION.—1896.

EXPERIMENTER.

in diameter ; M., Medium, 1½ to 3½ inches in diameter ; L., Large, over 3½ inches in diameter. D., Deep ; B., Broad.

Fruit.							Remarks.
Stem.	Basin.	Calyx.	Core.	Skin.			
				Color.	Texture.	Flavor.	
½ inch..	small...	closed ..	M	deep yellow	very firm, juicy	spicy and very sweet.	
½ inch..	small...	closed ..	S	yellowish	crisp, coarse	sub-acid.....	
½ inch..	large ..	closed ..	L	white	tender, juicy	melting	
¾ inch..	small...	open ...	S	white	tender	sub-acid.....	
¾ inch..	narrow.	closed ..	M	white	mellow	rich and mild ..	
¾ inch..	small...	open ...	L	white	tender	sub-acid.....	
1 inch..	medium	closed ..	S	yellowish white.	firm, juicy.....	sub-acid.....	
¾ inch..	narrow .	open ...	M	yellowish white.	crisp and juicy	mild, sub-acid..	
¾ inch..	small...	closed ..	S	white	firm and crisp	rich, sub-acid ..	
¾ inch..	shallow.	closed ..	S	white	tender, fine grained.	rich and sub-acid	

EXPERIMENT STATION.

EXPERIMENTER.

1 in. long	shallow, irregular.	partly closed	.....	yellow	firm, crisp.....	only medium ...	have better seedlings.
M	M	l., partly closed	.....	white	coarse.....	only fair	.....
S	shallow.	shallow.	.....	"	crisp, juicy	good	.....

LAWRENCE STATION.

EXPERIMENTER.

½ in., m. st., in. one side d. easily	shallow.	small, closed.	¾-⅝ inch, closed.	white	tender, juicy, fine grained.	brisk, sub-acid.	see plate.
½ inch, fleshy, in. one side.	shallow, broad, even.	open ...	oblong, 1 x ½ in. closed.	white, sometimes streaked with red lines.	firm, juicy, very fine grained.	sub-acid	see plate.

EXPERIMENT STATION.

EXPERIMENTER.

½-¾ inch	B	open ...	.....	white	firm.....	sub-acid	.....
¾-1 "	B	pt. clos'd	.....	yellowish white.	tender, juicy.....	"	.....
½-¾ "	S	"	.....	white	crisp, juicy	mild sub-acid ..	.....

APPLES.—BAY OF QUINTE STATION RECORD FOR 1895.

W. H. Dempsey, Trenton, Experimenter.

Variety.	When planted.	Soil.	Cultivation.	Fertilizers used.	Date of pruning.
*American Golden Russet	1879	loam	cultivated till August ..	bone and ashes	April.
Fall Queen (Haas)	1882	sandy loam .	" ..	phosphate	Mar..
Grand Sultan	1884	" ..	" ..	bone and ashes	May .
Golden White	1888	" ..	" ..	"	May .
Golden Sweet	.....	" ..	plowed	stable	April.
Gravenstein	1882	" ..	cultivated till August ..	"	May .
*Hurlbut.....	1882	" ..	" ..	"	May .
Hastings	top graf'd. 1880	" ..	" ..	"	May .
Jonathan	top graf'd 1880	" ..	" ..	.....	April.
Munson Sweet.....	.....	" ..	sod	.....	Mar .
McIntosh Red.....	1882	" ..	cultivated	.....	Mar .
*Mann	1882	" ..	"	stable	Mar .
Pewaukee.....	1882	" ..	cultivated till August..	" and bone...	May .
Plumb's Cider.....	1881	" ..	" ..	stable	Mar .
Rhode Island Greening..	1882	gravelly	" ..	"	June.
*Roxbury Russet.....	1876	sandy loam..	" ..	"	May .
Ribston Pippin.....	1882	gravelly	" ..	"	May .

APPLES—BAY OF QUINTE—*Continued.*

Variety.	Thinning—per cent. by hand or accident.	Time of blooming.	Date of gathering.	Yield.	Grade. Class 1.	Grade. Class 2.	Grade. Class 3.	Average price.	Remarks.
	bu.			bu.	bu.	bu.	bu.	bbl.	
American Golden Russet.	.....	May 9..	Oct. 20	6	3	2	1	$3 00	March, 1896.
Fall Queen (Haas)	.....	" 8..	Sept ...	4	3	½	½	1 00	.....
Grand Sultan	.....	" 8..	Aug ...	4	3	1	.....	1 00	Dwarf tree.
Golden White	.....	" 8..	Sept ...	3½	3	.....	½	75	.....
Golden Sweet	... ...	" 7..	" ...	16	14	1	1	50	... .
Gravenstein	.....	" 6..	" ...	4	3	½	½	1 50	.....
Hurlbut	1	" 9..	Oct	7	6	½	½	2 00	1895 crop.
Hastings	1	" 8..	"	15	12	2	1	1 00	.....
Jonathan	½	" 9..	"	6	5	1	....	2 00	1895 crop.
Munson Sweet.....	2	" 6..	Sep. 29.	15	12	2	1	50	....
McIntosh Red	1	" 7..	Oct	7	6	½	½	2 00	1895 crop.
Mann	½	" 8..	"	4	3	½	½	3 25	"
Pewaukee	2	" 9..	"	12	10	1	1	2 00	"
Plumb's Cider...	2	" 8..	"	21	17	.....	4	50	....
Rhode Island Greening..	½	" 8..	"	8	6	1	1	1 00	.....
Roxbury Russet	2	" 9..	"	10	8	1	1	2 50	1895 crop.
Ribston Pippin	¼	" 7..	"	2	1¾	....	¼	1 50	....

* Stored in fruit house at a temperature of from 30° to 36°.

NOTES BY EXPERIMENTERS.

St. Lawrence Station.

I have planted this year for experimental purposes 34 varieties of apples, 21 of Pears, 15 of plums, and 11 of strawberries. The names of these will be found in the accompanying table, with the exception of the strawberries of which I will mention later on. There was very little to report this year on varieties just planted, but it will be interesting to watch the progress of the trees under a system of cultivating the land to hoed crops of different kinds for the first few years.

Of the 12 varieties of strawberries sent me 11 lived and grew well making a good stand of plants for fruiting next year. Varieties are :

1. Aroma (*S*) —Stooled out in the hill but made very few runners, foliage free of rust, and healthy.

2. Bubach No. 5 (*P*).—Medium leaf, moderate runner, traces of rust, seems vigorous.

3. Brandywine (*S*) —Large healthy foliage, no rust, free runner, very vigorous.

4. Beauty (*S*) —Medium leaf, free runner, some rust, vigor moderate.

5. Belle (*S*).—Medium leaf, some rust, very vigorous and makes runners by the hundred, needs thinning to give fruit a chance to develop.

6 Grenville (*P*) —Medium leaf, moderate runner, no rust.

7. Haverland (*P*).—Medium to large healthy leaf, no rust, moderate runner.

8. Marshall (*S*).—Broad leaf, rusted, stools out for the first 2 or 3 months after planting and then runs freely.

9 Saunders (*S*).—Medium leaf, rusted, runs freely making an abundance of new plants.

10. Woolverton (*S*).—Large ribbed leaf, rusted badly, moderate runner.

11. Wm. Belt (*S*) —Seems identical in growth and character with Woolverton, but may show differently in the fruiting season.

The plants are set in a rather stiff clay loam manured heavily with barnyard manure. The season was favorable for a good growth having plenty of rain in every month except the early part of May.

Apples Under Cultivation and now Bearing.

Alexander.—Origin, Russia. This apple is not very largely cultivated in this section, but will likely become a favorite fall variety when better known.

Brockville Beauty.—Origin, Leeds Co Ont. Not quite so hardy as the Fameuse but succeeds well in this section and is a favorite summer variety. Fruit should be thinned on the tree to allow the crop to fully mature and ripen.

Canada Red.—A long lived spreading tree. Should be planted 40x40 to get good results ; not very productive and takes 12 or 14 years to come into bearing. Fruit is of only medium quality, but its long keeping qualities and fine appearance makes it a fair market sort.

Duchess of Oldenburg.—Origin Russia. Its hardiness, productiveness, and handsome appearance makes this apple a general favorite. It is highly esteemed as a cooking variety, and ranks first as a market sort, in its season.

Fameuse.—The standard variety here. For productiveness and high quality of its fruit we have very few to equal it and none to excel. The foliage and fruit are subject to spot, but by spraying with Bordeaux we are able to overcome the only serious defect in this noble tree.

La Rue.—Origin, Leeds Co., Ont. When grown is sod it takes nearly as long as the Spy to come into bearing, but usually its bearing age is about 9 years largely planted in this section as its large size and handsome color makes it a good market sort. Subject to spot, and will crack open if trees are not carefully sprayed.

Scarlet Pippin.—Origin, Co. Leeds. This is an apple that gives promise of being a close rival to the Fameuse both in productive qualities and as a market sort. The fruit is above medium in size, oblate in form and the skin is a white waxy ground covered with a bright red or crimson. This year it gave me 25 cents per barrel more than my first-class Fameuse.

Talman Sweet.—Quite a popular variety here. Keeps well and is valued by many as a baking apple. Though very productive it is not a profitable apple to grow.

Wealthy.—Origin, Minnesota. This apple is hardly as good a keeper as the Fameuse, but is in good condition, kept in a cool cellar, until Christmas. Should be picked about the 5th to 10th September here, and shipped in that month. Tree a good bearer of even sized fruit, but inclined to split at the crotches, and shows indications of blight in some cases.

Yellow Belleflower.—A highly prized variety on account of the fine flavor and tender breaking flesh. It is a good keeper, but does not command as high a price on the market as it should on account of its lack of color. Tree a moderate bearer, but profuse bloomer; partially self-sterile. I have never been able to get a full set of fruit although I have several varieties rich in pollen and blooming at the same time set close by.

St. Lawrence.—A fine large apple of handsome appearance, liable to spot and crack if not sprayed. A good market variety, a favorite here.

Memo. of Blooming Period

May 11.—Duchess of Oldenburg.

May 12.—Red Astrachan, St. Lawrence, Fameuse, Scarlet Pippin.

May 14.—Brockville Beauty.

May 15.—Canada Red, Belleflower, Talman Sweet.

May 16.—Blue Pearmain, Golden Russett.

Spraying and Results.

On the 30th of April the buds on the apple trees were just bursting when I sprayed with Bordeaux mixture and Paris green for fungi, bud moth, and case bearer.

On May 2nd I first noticed the case bearer moving up to the tops of the opening buds when I sprayed with kerosene solution 1 to 12 of water with the result that whereas the trunks and limbs were covered with millions of these insects it practically exterminated the pest from my orchard as on close examination this summer I could only find two healthy specimens, and the most of the insects never left their winter quarters. Care should be taken in spraying with kerosene emulsion not to pump out the last few gallons, for if the emulsion was not perfect there would be a little oil on top floating that will injure both foliage and twig in the spring. I injured three limbs on three different trees by moking this mistake.

On May 23rd I found the oyster shell bark louse moving, and washed with kerosene emulsion 1 to 5 on the trunks and limbs with good results. Note the early date at which these insects moved. It is generally supposed that they move about the 1st of June, whereas a very warm spring evidently influences the hatching season.

On May 26th I sprayed Bordeaux mixture and Paris green for fungi and codling moth, and after that date I saw so little indication of spot that I did not repeat.

Fungi did not appear to any appreciable extent until about the middle of August, when it showed on the foliage of the Fameuse and Baxter.

In watching the development of the egg of the bark louse on the 24th May, I was pleased to see a minute parasite destroying the eggs by boring into the egg. It was black, and I could plainly see him after he had entered the egg. I was using a good glass at the time.

Twig blight has been troublesome in this section attacking the Duchess the most. I have only two cases to report, both Fameuse, which I intend cutting down and destroying by fire. I am in hopes before long we will be able to have a preventive for blight instead of the very unsatisfactory remedy prescribed at present.

HAROLD JONES.

SIMCOE STATION.

Most of the stock planted came through in good shape and made a fairly satisfactory growth, considering the circumstances of this somewhat exceptional year. The young trees planted two years ago, are all thriving, except the Red Canada; and it has failed entirely and seems too tender here. According to Downing it is not worth growing, anyway. One of the young Russians bore one specimen this year—the Bogandoff. It is evidently a winter variety; size, medium; round oblate; skin, green, splashed and dotted with dull red; stem an inch long, set in a deep wide cavity; calyx partly closed in a shallow irregular basin; flesh firm, crisp, but lacks flavor. There are plenty of better seedlings than this apple. Another Russian, the Hare Pipka, received from the central experimental farm, Ottawa, some few years ago, has borne this year. This variety is evidently an early and abundant bearer. It is of the Alexander type and family, and resembles it very much, but is not quite so large. Tree very healthy, vigorous, hardy; fruit large, conical; color greenish yellow, thickly overspread with red; stalk medium, set in a moderately deep cavity; calyx partially closed in a medium basin; flesh coarse, white; flavor only fair; good for cooking. It will be no improvement on Alexander, unless it may be in the matter of earlier bearing.

One valuable characteristic of these Russian varieties is that they are all or nearly all very hardy, so that if the fruits prove inferior they will no doubt make excellent stocks for grafting such varieties on as Spy, Baldwin, King, Greening, etc. We are growing too many varieties now, and that is one of the troubles with apple culture in this province. There is a great deal of stuff grown that nobody wants, while the best varieties never go begging for a market. Golden Russet is a very unsaleable variety, except for export late in the winter, and only large exporters have the facilities for doing this. The most popular winter apple is the Northern Spy, and if people would graft their unsaleable varieties while still young with Spys, Kings, Baldwins, Ribston and Blenheim Pippins and Greenings, they would always find a ready market for them. Besides, it is the only certain and successful way of growing these varieties here. It is because these varieties have proved tender and short-lived that people avoid growing them in this district, and are growing too many varieties that are not wanted, such as Early Harvest, Tetovsky, Astrachan, Fall Pippin, Keswick Codlin, Haas, Wallbridge, and others that are practically unsaleable. We should aim to grow the apples that have the most commercial value, and study how to grow them successfully and profitably, and teach others how to do it. A year of over-abundant crops like this, teaches a valuable lesson as to the value of varieties for market. In the British market we find the well known Ribston and Blenheim Pippins away up in price, equal with our Fameuse and King. Both these apples do well here, the Blenheim being a shy bearer while young; but both of these grafted on our hardy kinds would give early and profitable crops. They are both clean skinned, and the Blenheim as grown here is certainly a very handsome apple, and being such a favorite with the British consumer they are likely to be always in demand. Speaking of the home market, I find these to be the most popular sorts. The best early apple is undoubtedly the Duchess, but more of them are grown about here than there is a market for. But if ever facilities are provided to get them to an outside market they will be the most profitable apple grown here. I sold most of mine this year at a better price

than the winter apples—$1.25 per barrel f.o b. for choice selected. We have many excellent fall apples, the most saleable being Alexander, Wealthy and St. Lawrence. These do remarkably here and are very popular. In winter apples the most popular for home market, away ahead of all others, is the Northern Spy. Its chief fault is its tender trunk and the long time it takes to come into bearing. But when top-grafted on a healthy, hardy stock it bears in from five to seven years, and the man who catches on to this and puts it into practice will be "in it." Next in order come King, Baldwin, Ribston, Blenheim, and Greening. Fallawater and Canada Red sell fairly well. The Pewaukee is a fairly good winter apple, but drops early from the tree. I will not recommend the Ben Davis to any one, although it still has value as an export apple, but I believe its poor quality and flavor must eventually tell against it. Locally, our dealers won't touch it at any price, as long as they can get anything else.

Apples, though a large crop this year, were a very fine sample, clean and large. The Snow, usually so affected with fungus scab, was clean, large and fine. This old well known variety is the most popular early winter dessert apple grown here, and a great favorite in the home market. It is also rising in favor and price abroad. On account of its liability to spot, the trees should be planted far apart and where possible on rolling ground, and well pruned, as this apple requires plenty of sunshine to attain to the greatest perfection. It should also be sprayed regularly with Bordeaux.

I did very little spraying this year and fortunately there was little need of it. Like many others I had planted my bearing orchard too close, and this year found it necessary to cut out a good many trees. With the press of spring work it was late for the first spraying before I got this done, so that I only sprayed the young trees and bushes. Next year I intend to give everything a thorough treatment.

Pears. I had a fair crop of the finest Flemish Beautys I ever saw; not a spot or crack in them. One plate shown in my collection at the "Industrial" at Toronto, was in the opinion of experts the finest sample shown at the fair, showing that this variety can be grown to great perfection here. The young trees of Flemish Beauty, Bessemianka, Bergamot and Baba are thrifty and making a satisfactory growth.

Plums. Fifteen varieties planted, all doing well. Two varieties fruited this year that were received three years ago from Ottawa. One of these the Rollingstone, is a small pink plum covered with a white bloom and of fair quality but very small. The other "Cheney" is larger and red in color but no better in quality than many of our common wild varieties.

Cherries. The Russian Cherries are very healthy and thrifty, and I have great hopes that we shall find in them something that will be a valuable acquisition to this section of the province. Two of these, the "Dye House" and "Bessarabian" two years planted, bore a few cherries this year. They were so much alike that I could see no difference in them. Both are sour cherries suitable for canning, are a little larger than Early Richmond, and when fully ripe are a very dark red in color, nearly as dark as the Black Oxheart. They are too sour, however, to suit my own taste, and I hope some of the other varieties of which I have about ten, will prove to be a little sweeter and less acid. But the point of value in these Russian Cherries is their hardiness, thrifty growth and freedom from disease, and as the growing of cherries has been almost entirely abandoned in this section, these new varieties, if they prove on further trial to be all that I except them to be, it will awaken a renewed interest in the growing of cherries all through this district. Next year if these cherries show any bloom I will prepare to make a careful record of date of blooming, growth and date of ripening, etc. The only insect pests troubling them was a kind of "slug" on the leaves. These were easily destroyed by spraying with the Bordeaux mixture, with Paris green added, 4 oz. to 42 gallons of the mixture.

Gooseberries. My soil is not suitable for them, and they are not doing as well as I would wish though they are well cultivated and manured. Downing, Houghton, Smith's Improved and Pearl are thrifty and growing but have not borne any fruit yet, with the exception of Houghton which bore a full crop this year. Red Jacket and Industry are both total failures here.

Blackberries. Of these the Snyder has been growing here for years, is perfectly hardy and bears well, but I want something of better quality. I have some seven varieties under test, but none of these have borne as yet. I expect next year to be able to make a comparative test as to the quality of these different varieties.

Raspberries. The Cuthbert is still queen of the market but rather late. And the Marlboro' comes in for the early crop. I have some twelve varieties of raspberries under test, but most of them are too young for purposes of comparison as yet, although several bore this year. Of these two deserve special mention, Smith's Giant and Columbian. The first a black cap and the other a cross between red and black, very much like the Shaffer. Smith's Giant is a good bearer. The fruit large and firm, but not of high quality. It is hardy, however, and last winter was exposed to a temperature of 25 below zero without any damage to the canes. The Columbian is a prodigy in point of yield. It seems perfectly hardy and vigorous in the canes, and the berries are about the same size and color as Shaffer, and it would be difficult to distinguish any difference in the appearance of the fruit, except that the Shaffer is possibly a little darker in color, while the Columbian is a little firmer of the two. They are a good berry for canning, and everyone who grows raspberries should give the Columbian a trial. If it does as well next season as it has this, I will have no hesitation in recommending it for general planting.

Currants. Of the twelve varieties under test I can say only that they are well manured and cultivated, and are growing well, some bearing a little fruit, but on the whole not enough for comparative purpose as yet. I propose to try the experiment of heavy mulching for black currants instead of working the soil about the roots, and compare the results with others of the same age, which are kept cultivated strawberries. Of all the new varieties tested, few, if any, are any improvement on the well-known varieties. Many of the new ones give very large berries, but come very far short in point of yield. While there are many that in point of quality excel the Crescent and Haverland, none of them come near them in yield in my experience. It is a question to be determined by the grower himself, whether it will pay him to grow the larger and finer kinds, if he can get a higher price for them or to grow the smaller though more prolific varieties at a less price. That will depend on what kind of a market he has. If it will take the larger kinds at a considerably higher price, it will pay him to grow them On the other hand if they would make little or any difference on the score of quality and size, then the more prolific kinds would be the most profitable to grow. Some of the new varieties such as Bubach, Warfield, Beauty Aroma, are pre-eminent in the healthiness of their foliage and freedom from rust.

A list of those tested which are considered worthy of culivation so far will be found in the tabulated statement.

G. C. Caston.

East Central Station, near Whitby.

Looking over past seasons I find the following results :

Apples. Apples that have yielded the most per tree in the past ten years : Haas, Wealthy, Boston Star, R. I. Greening and Baldwin, in the order named.

Apples that sold for highest price per barrel : Spy, Salome, Red Canada, Baldwin, R. I. Greening, Minkler and Golden Russett, in order named.

Apples that bear most regularly : Haas, Minkler, Twenty Ounce Pippin, Grimes, Golden Salome, R. I. Greening, Red Canada, in order named.

Pears. Varieties that have produced most fruit per tree for ten years are : Kieffer's Bartlett, Louise Bon de Jersey, Belle Lucrative, Howell.

Varieties that sell the highest : Doyenne d'Ete, Rostiezer, Bartlett, Sheldon, Duchess d'Angouleme, in order named.

Varieties that fruit most regularly : Kieffer's Hybrid, President Drouard, Bartlett, Josephine de Malines, Rostiezer, Flemish Beauty, in order named.

We have several varieties planted less than ten years, that I think may surpass those named in my list here.

The apple crop this season in this district has been exceptionally large, and the prices correspondingly low, but I notice in European reports prices are fair for No. 1 stock, and why shippers will forward anything but No. 1 stock this season I cannot imagine, as there is enough first class apples for shippers to send at paying prices. Just to-day a shipper here got returns for a car load he sent to Liverpool, and after paying all expenses, he netted just seven cents per barrel. The reason is very plain. The apples were not properly assorted, and were poorly packed, and were early fall fruit at that, so that when they arrived the juice was running out of the barrels. Apples in this district have been selling at from forty to sixty cents for fall fruit, fifty to seventy five cents for winter, and twenty cents per hundred pounds for evaporating.

In pears there has been a full supply, Bartletts generally taking the lead, although not much difference in price. Mostly all are sold in baskets, from twenty-five to thir y-five cents per basket. Some winter varieties being shipped in barrels are bringing $2.00 to $3.50 per barrel.

Plums. No plums were grown in this district this year and yet prices were very low, from thirty to sixty cents per twelve quart basket, which were mostly brought from Niagara district *via* the Toronto dealers.

Peaches. Peaches were also cheap as compared with former years ; all imported here *via* Toronto.

Grapes. Few grapes are grown, but samples shown were fine in size and quality.

Cherries were a medium crop but fine quality, and retailed here from $1.00 to $1.25 per twelve quart basket.

Goosberries were a remarkably fine crop both in quantity and quality, and no mildew.

Black Currants were not very good.

Strawberries were very fine for first picking, but dried up later on.

Altogether the season has been satisfactory, as regards quantity of fruit, but prices have ruled so low as to leave a very small margin for the producer.

Insects and fungi which formerly did serious injury, scarcely put in an appearance this season. Spraying has been pretty commonly practised and beneficial results have followed.

We all look for an improved system in grading, packing and marketing our surplus stock ; but the most essential part is to keep improving the quality, something about which I shall speak later on.

I have surrounded our new plots with Norway Spruce to serve as protection against wind when the trees are fruiting. I planted our apples thirty feet apart each way, and planted a pear in the angle between the apple rows. In this way I get 100 apples and 81 pears in a two acre plot, with a space on each outside, say 20 feet. Being accurate in planting, the rows of young trees look very beautiful when in foliage.

R. L. Huggard.

Georgian Bay Station.

Plums. We are rather short of material this year for a very full report, new varieties not in bearing and old ones nearly all described. There are now in test at this station ninety-seven varieties of plums from which in the course of a few years we expect to give some valuable information.

Yellow Egg.—Vigorous upright grower, like Pond's Seedling. Branches smooth and long; should be headed in; bears well for that class of plum.

Yellow Gage.—Fairly vigorous, upright grower; sufficiently hardy and productive; rather poor shipper for distant markets.

Howard's Favorite.—Fine late plum; vigorous grower and early bearer; branches smooth; very hardy; regular bearer of good crops; good shipper.

Prince of Wales.—Vigorous; productive; hardy; branches somewhat downy; fruit large, often two inches in diameter; excellent quality; good shipper.

Early Black Damson.—Almost too well known to need description, but should not be confounded with the common, sour, blue, fence corner plums that are grown about the country. Extra hardy and productive. I have thirty trees of this variety, six years old, which the past season produced 140 twelve-quart baskets.

Japan Plums. In answer to many enquiries about Japan plums, we have not fruited any yet. They are good growers, and wintered well last year. There are several filled with fruit buds now, noticeably Burbank and Willard. All points considered, I would say, go slow with Japan plums.

Peaches. We have a few in test. Such varieties as Champion, Hales Early, Wonderful, Elberta, Fitzgerald and Tyhurst wintered to the last bud, and are now filled with fruit buds.

J. G. Mitchell.

Wentworth Station.

Fourteen varieties of grapes and a few plums have been added this year to the experimental planting. The trees have made a good growth this season.

On account of the late spring frost of 1895, the experimental plantation of grapes were all pruned back and not trellised this season. We now have a good growth of wood and expect next season to report on many of the new and untried varieties.

The season being rather dry has been favorable for grape growing, but the thrip has increased during these dry seasons very rapidly and has injured the Delaware and other thin leaved varieties very much; clean cultivation, the old remedy, is not a preventive.

The pear tree slug has been very bad this season. The eggs are laid early in June on the leaf by a four winged black fly; these hatch in about two weeks and become fully developed flies in about four weeks more, which propagate a second brood early in August, and are difficult to destroy on account of the danger of poisoning the fruit, which makes it important that the trees should be kept carefully sprayed with Paris green or Bordeaux mixture as soon as the first brood appears.

M. Pettit.

Niagara Station.

The following report, which I beg to submit to you, deals with fruits tested at this station and in the immediate vicinity. The annual loss to the fruit growers of Ontario from the attacks of various insect pests is so great that I have ventured to treat the subject briefly in the latter part of the report. There is a healthy and growing interest in this phase of horticultural work, and anything that can stimulate it may be of some value.

There have been planted at the station this year 266 trees, composed largely of peaches, but embracing many varieties of the sweet and sour cherries, plums (including the leading kinds of the Japanese type), apricots, nectarines, mulberries, and numerous Japanese chestnuts. With the view of determining the most suitable soil for the Japanese plums, some trees have been planted on a comparatively light sand, and others on heavier soil with a pretty stiff clay sub-soil.

Peaches. The peach crop in this district was extremely light, owing to the unfavorable conditions of last winter.

Reeve's Favorite originated by Mr. Samuel Reeves of New Jersey, this is one of the finest of the newer varieties. It is a strong upright grower with dark green crinkled foliage. The fruit is very large, roundish, marked protuberance of calyx end; color, light yellow with red cheek; sature, indistinct; free stone; pit, medium size and deeply corrugated; firm texture; good flavor; season, a few days to a week later than Early Crawford. It bears fruit of a very uniform and large size. Some growers have found it a heavier bearer that Early Crawford. It has the reputation in Delaware of being shyer than Crawford, but they value it highly, and I think Reeve's Favorite should certainly have a good place in every orchard.

Wager, Hill's Chili and Longhurst came through in good shape, produced good crops. These varieties are much of the same type, though Wager is rounder and yellower as to fruit. The trees are moderate growers, foliage not luxuriant and of a narrow willowy leaf. The fruits are characterized by great downiness, a very free stone; flesh, of a firm, dry texture and with excellent canning qualities. Of other varieties here, Early Rivers, Barnard, Stevens' Rareripe, Early Crawford and Mountain Rose did best in the order of naming, but none of these produced anything like a crop.

Champion.—The new variety, will hardly, I think, be a profitable one to plant. Notwithstanding many good qualities, its white flesh, partial cling stone, and the fact that it matures about the season of the Early Crawford, must condemn it as a commercial fruit.

Plums. The varieties minutely described in this report are chiefly plums not generally grown, some of which deserve a more extensive planting. Several of them have been tested by Mr. Glass within a mile of the station, for more than twenty years.

Coe's Golden Drop.—A somewhat slow grower, but on account of its size, flavor, and time of ripening should secure a prominent place in all orchards. This, and Reine Claude de Bavay, I consider our most valuable late yellow plums.

Shropshire Damson.—Of English origin, and, in my opinion a valuable fruit, have found it very productive and quite hardy; tree, a fair grower though small; branches slender. Not of the finest quality for dessert, but excellent for preserving. Hang an the tree till October and its lateness of season should prevent any confusion with the common blue plum.

Shipper's Pride.—Under this name there are grown two distinct varieties. The one grown here is a vigorous upright tree, quite hardy and productive. Fruit large, roundish-oblong, dark blue with heavy blue bloom and distinct suture, ripening about August 20th. Flavor extremely poor, no good for dessert, or canning purposes.

The other variety in a large blue plum, more of the egg type, somewhat similar in shape to Grand Duke. At the Experimental Farm at Agassiz, B.C., the Shipper's Pride, is identical with the one grown at this station. Specimens of both varieties were sent by me to Messrs. Elwanger and Barry, but were unfortunately lost in transit. Mr. S. D. Willard was inclined to think the one grown here was correctly named, and the Michigan Station reports a similar plum as the Shipper's Pride. The attempt to settle finally the identity of varieties can, I think, be made an important part of our work.

Prince of Wales.—An old variety of English origin, little known, but now receiving a fuller recognition of its merits. It is a free stone plum of good quality, a heavy bearer and vigorous grower; quite hardy here.

Goliath.—This is a fine, large, reddish blue plum, ripening if anything a little ahead of Lombard; fairly productive and hardy and of good quality, especially for canning.

St. Catherine.—An old and well-known French variety, not grown here as much as it should be. A handsome yellow plum, marbled with red, excellent flavor, moderately vigorous and productive.

Cherries. Through the whole of this district cherries were this season a remarkably full and clean crop. Of the sweet or Heart type, Knight's Early Black did best here, one tree yielding 180 quarts of fine fruit. Among the Morellos, Early Richmond, and Montmorency, have proved most profitable. Montmorency ripens directly the Early Richmond is finished. It is a vigorous grower with compact bushy head, quite unlike the open spreading character of the Richmond. It should be kept well thinned out in the centre when young. The fruit is a shade larger than Richmond, and is a fine firm cherry. Of cherries, of the Duke type, which in character come half way between the Morellos and the Hearts, May Duke ranks easily first. It is a fine juicy melting and slightly acid cherry; an excellent canner, and, when fully ripe, a rich and luscious fruit for dessert purposes. Ripens here last of June. The tree is a particularly upright grower. The fruit forms in clusters, and has a good quality of parting very easily from the branches. It has proved with me a good and regular cropper.

Notes on Injurious Insects.

The Peach-tree borer (*Ægeria Exitiosa*).—This pest, the larva of a slender day-flying moth, does far more damage through the peach orchards of the country than most growers suspect. I find, that, where they are searched for at all the usual practice is to cut them out with a knife, but I believe the application of a wash to the tree to be the better plan. The moth, as most fruit-growers are aware, will lay eggs anytime from June till October, the grub usually passes the winter in the tree in its larval state, emerging into the moth condition again in the following summer. The egg is usually laid at the base of the tree, the young larva immediately gnawing its way to the inner bark upon which it lives, its presence later on being indicated by gummy castings. I have used air slacked lime with success, heaping it around the tree in spring, and removing it for the purposes of examination in the fall, but I believe a wash to be the desirable method. It is far better to prevent the moth laying the eggs than to hunt for its destructive progeny afterwards. A thick whitewash with enough carbolic acid to give it a strong scent is usually effective. If ashes are mixed with the wash it is likely to stay on the tree somewhat longer; or one pound of common hard soap with two gallons of water, heated to boiling, and add afterwards half a pint of crude carbolic acid. I hope to test systematically next season the various remedies, and report as to both effectiveness and cheapness.

The Black Peach Aphis (*Aphis Persicæ niger*).—This insect, sometimes called the peach root-aphis, is one of the numerous family of plant-lice, and in its underground form is a difficult foe to fight. I have observed the injurious effects of its attacks on young peach trees during the past season. The growth of the affected trees was very poor, and the foliage looked sickly and yellow. The shiny black aphides were found clustered on the young rootlets upon the juices of which they feed, thus utterly preventing the development of a healthy root system. The case is doubtless often diagnosed inaccurately as Peach Yellows. Refuse tobacco dug in around the tree has been found successful, but Prof. J. B. Smith, of New Jersey, who has studied the matter closely, advises an application of Kainit. Kainit has the additional value of being a good fertilizer for the peach. It usually contains from ten to twelve per cent. of pure potash and about thirty-five per cent. of common salt. Apply to the tree directly trouble is suspected. Spread it round about as far as the roots reach. Put on before a rain if possible; the solution will kill the aphides by contact, and the tree will take up the fertilizing elements. About two pounds should be enough for a newly planted tree, increasing the application to ten pounds for a tree in full bearing.

The Peach Bark-borer (*Phœoribus liminaris*).—A small beetle about a twelfth of inch long is responsible for much serious damage to peach trees. As yet it has not spread to any great extent, but where it does occur immense injury is done. I have observed a great deal of its work in Niagara township, and some in this neighborhood. The beetles bore their way into the bark all up the trunk, and the small grubs pass their life in the bark, emerging in due course as beetles.

The trouble is easily detected in the earlier stages by the red powder cast out as the beetles bore. Later on immense quantities of gum ooze from the infested trees, as much as a gallon in bad cases. When a tree is very badly attacked, I believe it would be advisable to take it out and burn at once, thus preventing the spread of the pests. If the tree, however, is taken in time, it can be saved. Dr. Fletcher reports very fully on this insect in the Experimental Farm Reports for 1894 and 1895. At Queenston, where the evil has been most serious, the following wash has been found successful:—5 pounds of washing soda, 3 quarts soft soap; add enough water to make about 6 gallons; put in enough air-slaked lime to make the mixture thick, and to this add 2 table spoonfuls of Paris green and 1 ounce of crude carbolic acid. Apply with a whitewash brush, thoroughly covering the trunk and the lower part of the main limbs.

The Plum Curculio (*Conotrachelus nenuphar*).—Description is unnecessary, as this beetle is well known. I have tried most of the remedies advocated, but consider spraying and "jarring" the only effective methods. Next to these I have found dusting with air-slaked lime the most valuable. Many leading entomologists believe that jarring is the only sure remedy. This season I tested both methods, and, while I found that from a carefully sprayed tree a few curculios could subsequently be jarred, yet results were equally satisfactory. Prof. Wild, in his valuable little book, "Insects and Insecticides," says the curculio eats foliage and blossom and gnaws the plum to satisfy its hunger. My impression is that it lives entirely on the leaf. I have observed it feeding, but think it more than likely that the poison is some time in taking effect. Jarring, while comparatively easy with young trees, is both more difficult and less satisfactory with larger ones. If spraying is equally effective, and I believe it is, the latter process should be adopted, as by combining the Paris green with Bordeaux mixture fungus diseases can be fought at the same time. The larva of the curculio usually leave the fruit a little while after it has fallen, and burrowing into the soil, change into the pupa state, emerging in a few weeks as mature beetles. Those entering the soil later on pass the winter as pupa, and come out beetles early next spring. As a single female beetle can lay from 150 to 200 eggs, it is highly important to pick up and destroy all fallen fruit, and thus cut short the next generation of beetles.

The Pear Slug (*Selandria cerasi*) is another familiar pest, but the damage done this year exceeds anything within my recollection, and shows that growers are not generally alive to the evil. The second brood in August did immense damage, the slugs working almost as freely on the plum as on the pear and cherry.

I usually spray with a solution of hellebore, one ounce to three gallons. Hellebore is a vegetable poison, killing both by contact and by being eaten. It is less dangerous to handle than Paris green, and in this case equally effective. Directly the slug appears spraying should be commenced. It is one of the easiest insects to control, but skeletonizes the leaf with great rapidity, and it is sure that thousands of trees will go into winter quarters this year with unripened wood and imperfectly developed buds, owing to the unchecked ravages of this noxious pest.

Other injurious insects, such as the Pear tree Psylla, Grape-vine Flea-beetle, Six-spotted Paria, etc., have not done sufficient injury to justify the giving up of more space. One great and growing evil must, however, be referred to, viz., "Peach Yellows." There is nothing new to say about this dread disease.

Dr. Erwin F. Smith, who has given years of study to the subject, has been unable to lay his finger on any definite cause and say "here is the trouble." But, while an exhaustive study, theoretically and practically, has been unable to discover the true nature of the disease, such study has amply shown that the axe and fire will prove effectual in preventing its spread. In common with many others, I have marked with growing concern the steady advance of the "yellows" in the Niagara Peninsula, and my firm conviction is that unless prompt and collective action is taken the orchards of the district will soon be decimated, and peach growing eventually be rendered unprofitable. The law in Ontario is perfectly adequate if enforced. Unfortunately, no man, however thorough in his methods, can wholly protect himself, as one infected orchard can spread the plague broadcast.

No expression of opinion, official or private, can be too strong or too frequently heard when the apathy of the municipalities is considered and the perfunctory way in which the law is carried out I trust, however, that we may see a vigorous movement in this matter before another year, and a steady abatement of the evil.

MARTIN BURRELL.

BURLINGTON STATION.

There are now under cultivation at this station 169 varieties of different classes of fruit, made up as follows :

Raspberries and blackberries	33	varieties.
Pears	25	"
Currants	17	"
Apples	22	"
Plums	42	"
Peaches	4	"
Grapes	26	"

RASPBERRIES AND BLACKBERRIES. The bushes planted in 1895 are doing well, and, as yet, are practically free of insects and fungi.

The Kansas, Columbian and Shaffer's Colossal promise well, and the Kittatimny passed through last winter unharmed by the cold, although it was not protected.

PEARS All the varieties planted last spring are living and have grown very well, the Wilder, Petite Marguerite, Josephine de Malines, Bosc, and Vermont Beauty being especially vigorous. The pear blight has done a great deal of damage to the older pears here this season, and appeared to strike two classes of trees, (1) those making a very strong growth of wood, (2) and those weakened by a heavy crop in 1895 The slug, too, did some injury, but was, in a measure, checked by spraying.

CURRANTS. Of the currants planted in 1895, the Cherry, Champion and Naples gave a few berries, the Champion averaging the highest.

APPLES. In this district, as elsewhere in the Province, the crop has been an enormous one, and I should say without precedent in this country. Wherever there were trees there appeared to be apples. For commercial purposes I consider the following the most profitable : Duchess, Ribston Pippin, King, Cranberry Pippin, Greening, Baldwin and Northern Spy. I doubt if any apple in this locality would stand the commercial test so well as the Baldwin.

The Wealthy and Ontario are almost new apples here and promise well.

The twig blight did considerable damage to the trees this season, especially to such varieties as the Greening, Holland Pippin, Ribston Pippin, Snow, Spitzenburg and Gravenstein. The younger orchards also suffered severely from the codling moth. The apple spot was not at all prevalent this year.

PLUMS. A tree of Ogon planted in 1892 has bloomed profusely for two years, but as yet no fruit has set.

All the trees planted are living and have made a satisfactory growth, the Pond's Seedling, Fellemburg and Burbank being very strong. By using Paris green and lime I prevented the second brood of the slug this season. Of the older trees the Lombard and Reine Claude were the only varieties that fruited to any great extent. The Reine Claude promises well for a late plum here, and as for quality, it is not excelled. I picked a few, that had been overlooked, from the trees on the 30th October and, save a slightly shrunken appearance, they were first class in quality. The Lombard, however, is the most profitable commercial plum here, up to the present time.

PEACHES. There were few, if any, here this year. The Alexanders and Crawfords are the chief varieties grown.

Grapes. The Concord, Worden, Vergennes, Lindley and Moore's Diamond are the most profitable here. The Niagara is too tender, and to be successfully grown must be protected in the winter. Moore's Diamond is, so far, the most satisfactory white grape that I have. It is healthy, hardy, vigorous, productive and of good quality.

A. W. Peart.

Simcoe Sub-Station.

I have to report an almost total lack of fruit for 1896, which I attribute to deep cultivation at the critical time when the fruit was forming, causing it to drop.

I may add that my own experience extending over some years, and the experience of a number of others, leads me to conclude that mulching is preferable to cultivation in spring for both gooseberries and currants. It secures the necessary conditions of "damp and cool."

The Pearl has again shown its superiority over Downing in vigor, and where closely pruned and liberally fertilized is a fine berry.

The fruit of both Downing and Pearl were attacked by mildew this season, which is very unusual.

Champion made a great growth of wood, but the fruit mildewed badly for the first time. I do not think this berry all that is desirable either in size or quality, but it is a step in the right direction The wild variety from which this berry originated is very vigorous, and perfectly free from mildew. It is of the same species as Houghton.

The White Crystal, another cross upon this wild variety, is a very promising variety, the young growth of wood and foliage not being seriously affected by mildew. I find the foliage of any variety affected in the same proportion as the fruit. The originator, J. H. Hynes, of Delphi, Ind., reports this variety to be a great bearer of very large berries.

Carnie's Yellow is fairly vigorous and seems, judging by foliage, to be able to resist mildew. The fruit sent me by Mr. Carnie, of Paris, was a fine size, twelve berries weighing $2\frac{3}{4}$ ozs. Phœnix, another berry sent by Mr. C., is very large, and the bush sent to the station is ahead of many others in freedom from mildew upon young wood and foliage.

A Champion, sent to the station by E. D. Smith, though it seems to be identical with Haynes' berry in wood, fruit and foliage, was entirely exempt from mildew in both fruit and foliage, the only berry so favored out of over 80 varieties except Haynes' wild.

Red Jacket, which held on to a few berries, has maintained its previous character. The berries were less affected by mildew than either Downing or Pearl. It is also as vigorous a grower as Pearl, if not more so. The fruit resembles Pearl somewhat in shape but is larger. Taken altogether this is one of the most promising berries we have, so far as we have been able to judge.

Success, Dominion and Oregon Jumbo have not been sufficiently tested to enable us to say much about them.

The fifty-two English varieties arrived in very bad condition, no doubt owing to the hot, dry weather in April and May. By a great deal of work, watering, etc., probably forty per cent. are alive. One variety, the Green Chisel, has not only survived but made quite a growth of new wood.

Whitesmith suffered severely last winter, the only variety at all affected. These bushes were well covered with snow the entire winter, and yet one-third of the wood was dead this spring—no fruit.

Crosby's Seedling is a very promising variety; vigorous with a good degree of immunity from mildew. No fruit yet.

Queen and Chautauqua, which resemble each other in foliage and general appearance of bush, suffered rather severely from mildew. No fruit this year.

Both Prolifics mildewed badly, but further testing is needed to form a correct judgment.

Crown Bob mildewed badly, as did Lancashire Lad.

Keepsake and Mrs. Whitiker seem to resist mildew better than Lancashire Lad, and Mrs. Whitiker especially made a good growth of wood. No fruit.

I may explain that spraying can hardly be made to protect the young growth of wood and leaves, as the tips will mildew in one night, and this year as fast as they grew. There has been on some varieties a succession of growths, the older growth rotting, and after a few weeks a new growth, which immediately mildewed in its turn.

STANLEY SPILLETT.

HALTON SUB-STATION.

STRAWBERRIES IN 1896.

The season of 1896 was one of the very best in the Guelph and Burlington sections, full crops and fair prices extended for a good month.

The drouth of 1896 was somewhat severe, so that only a thin stand of plants was made in many plantings, thus the plants had room to mature a full crop of fine size and good colored berries. One of the great mistakes made in a season when plants are freely made is that the grower allows too many plants to root, often a dozen plants occupy the ground that a single plant ought to have.

I am convinced from experience and close observation of many beds in the fruiting season, that if the grower would grow them so as to have the rows quite narrow, the rows could then be grown a little closer together, and so have more "edges," as I find the finest and best fruit is always picked from the edges of the rows; very few and only small berries being got from the middle of wide matted rows.

A grower will plant rows four feet apart and then think when he has got the plants to meet between the rows and standing a plant on almost every square inch of the ground, that he has a fine bed, and anticipates the crop of fruit he will obtain the coming season. I consider that in all such plantations a great mistake has been made; if he had cut off every runner after the rows were twelve or fourteen inches wide he would have a better crop in every way, and take in more money from the same ground because of the better price he would receive for the larger berries.

After sufficient plants are set, leaving paths eighteen inches to two feet wide which are for the pickers to move about in, then but few of the fine bunches of berries to be found on the edge of every row will be smashed or destroyed by the pickers. I am sure from my observation that a great deal of fine fruit on a row is destroyed by the pickers not having room to move about freely in; and be they as careful as they may in the very narrow paths that some leave, they will step on bunches. I have asked many pickers, "Where do you find the finest berries?" The reply invariably is, "On the outside of the row." "Where do you find the largest bunches?" "On the outside of the row." So I think if growers would let the strawberry plot go more to edges and less to centre they would get more and finer fruit on the same space of ground.

Strawberry plants are hardy, and it is not necessary to cover them to keep them from freezing, but on some soils, such as at Guelph, a covering is needed to prevent the frost heaving the plants out of the ground. A mulch is very useful in the summer time to protect the berries from becoming sanded after rain, and also to retain the moisture in the soil. Late fall or early winter is the best time to apply the covering, or it may be

put on in the early spring. We find pea straw the least objectionable, as it is freer than most straws from weed seeds. We have had the beds go into winter quarters free of weeds, so that the covering need only be removed from the plants to the paths in the spring and act as a mulch for the retention of moisture, and the keeping down of fresh weeds that might germinate in the spring.

The large majority of the varieties now before the public are only chance seedlings found in fence corners or on stone heaps, picked up by accident often or grown from seed taken by chance. A few have come from crossing well known sorts. Many originators have been satisfied to take seeds of some of the finest berries of some good kind; thus one parent only was known. Then again, some have taken great pains by fertilizing by hand under glass so as to know the parentage on both sides of all their seedlings. By far the most satisfactory results must surely be obtained by raising seedlings from crosses of the very best varieties.

One purpose in such work with us is to learn what varieties to make use of; which varieties are best suited to each other, and which varieties crossed produce the best results. No one can say what the result will be from fertilizing one variety with another, whether you use Woolverton x Haverland or Clyde x Timbrell. We are endeavoring to be exact in making the crosses, so that facts may be learned and better results secured.

What Kinds to Select.

This is of great importance, and one of no small difficulty. First of all the planter must determine just what he wants in a variety, and then select the one that in that particular is most widely successful, that come nearest his standard. There are varieties that are successful on most soils, and do well everywhere, while there are others that seem to require some particular soil to do their best. By taking no notice of the extravagant descriptions of originators or introducers and dealers, and trying in a small way, either by a dozen or 100 plants, those that are reported upon most widely as doing well, after one or two years' trial, a grower would surely soon determine for himself what variety is most suitable for him to grow.

A list of the varieties that succeed under widely different conditions would be a short one, but for the general grower, and certainly for the market grower, it would contain every one that it would be worth his while to try on his soil. Every one must test for himself, for no one else can tell just what varieties will best suit his soil and produce the best results for him; but it does not follow from this that the results of others' testing are of no worth to him. For instance, the fact that such a variety fails or has a weakness in one place shows that it is very likely to do so when grown in another soil. Keeping this before us one can very easily decide what kinds not to test.

The fact of the sexuality of strawberries is a well known one. The right proportion of perfect and imperfect flowered sorts to plant has not been settled and is still an open question. The season has a good deal to do with the proper fertilizing of the imperfect sorts. In a season when at the time of blooming if it is dry and sunshiny and somewhat windy, one-sixth or one-seventh of perfect flowering kinds would be sufficient, but if the blooming time should be cold, cloudy and wet the imperfect flowering sorts would not be perfectly fertilized if every other row was a perfect bloomer. It is best to plant the varieties together that bloom at the same time, that are same color and size.

It has been generally conceded that those having imperfect flowers are the most productive, but we are having some very fine perfect flowering kinds put before the public, viz, Clyde and Tenessee Prolific. These, from recent reports, are as productive as any of the imperfect flowering kinds.

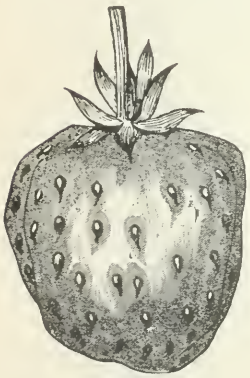
As for this year's crop it was a good one, all the standards doing their best. Any kind that could not give a fair crop under the favorable conditions of the past season could not do so under any conditions. In my opinion it was a very good season for testing the various kinds, and so would be a fair trial season. The soil here is a sandy loam, enriched with horse and pig manure put on in the fall.

I am able to say that Bubach and Haverland with us have kept their place among the leaders. Some few have gone ahead and taken a front place, notably among these have been the Clyde, now widely tested, and the Ruby not yet introduced.

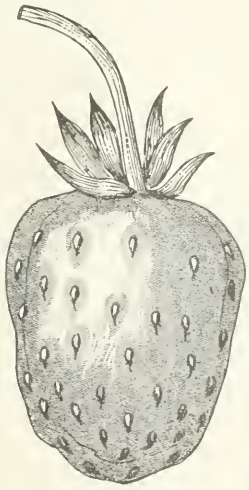
Description of Varieties.

Aroma, (S.)—A seedling of Cumberland, grown by E. W. Cruse, of Kansas. Plant very healthy; large, strong plant; good grower. Friut, fine dark red in color, large and firm good quality and quite productive. A good one to fertilize large pistillates with. In bloom May 18th. Ripe June 11th. A good one to grow.

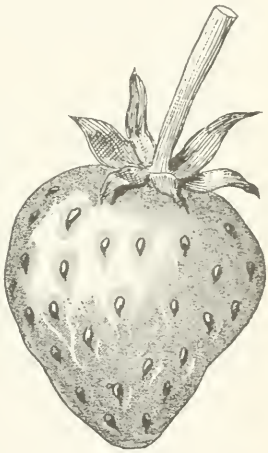
Bubach, (P.)—This originated in Illinois. The plant is magnificent; a strong and long rooted one. Dark, rich foliage; no sign of disease of any kind. Makes plants enough for a good fruiting row. The fruit stock is short, but strong and firm. The fruit is wonderful for its size and color. The berry is very showy, its bright color taking the eye. We call it very productive and profitable. The flesh is pink inside, quality good; medium in firmness. It succeeds well everywhere. In bloom May 7th. Picking June 6th. One of best.



Berlin.



Glen Mary.



Margaret.

Brandywine, (S.) This variety originated in Pennsylvania. It is one of the most vigorous of growers, making a wide matted row, if allowed to do so. The plant is healthy and strong and dark foliage. It is supposed to be a seedling of Glendale and Cumberland, and the fruit is of large size, heart shaped, a fine dark scarlet in color, firm and of good quality. The plant succeeds in most soils. In bloom May 21st; first picking June 14th. Its one great fault is that it does not produce enough.

Bisel, (P.) This comes from Illinois, originated by D. Bisel from the Wilson. A good grower, making plenty of plants for wide row; shows some rust. Fruit a good bright red in color. Very productive and quite firm, a good market sort; said to be in great demand in the Chicago market. In bloom May 20th; first picking June 13th. A good one.

Berlin, (P.) This is from Maryland, originated by J. Harrison from seed of Bubach. The plant is a good grower, makes a good row. It is much like its parent. The fruit is not as large, nor is it on the whole any improvement. In bloom May 9th; first picking June 6th. Not as good a variety as the Bubach.

Banquet, (S.) A supposed cross with the wild strawberry. The plant only medium in vigor; fruit of fine quality, medium in size and not a great deal of it. In bloom May 18; ripe June 13th.

Brunette, (S.) Comes from Indiana. The same may be said as of Banquet; fruit of fine quality, but not enough of it. In bloom May 16th; ripe June 13th.

Bouncer, (S.) A seedling of Jersey Queen and Miner, from Conn., sent out by J. Hall, paying $50 for the most suitable name for it. It is only a medium sort with me. After one year's fruiting will give it another trial. In bloom May 18th; first picking June 13th.

Carrie, (P.) A seedling of Haverland, by Mr. Thompson of Virginia. It is a strong grower, making very long runners and plenty of them. It is much like Haverland. The fruit is firmer and of better color. In bloom May 18th; first picking June 9th.

Cyclone, (S.) A seedling of Crescent and Cumberland, from Kansas by E. W. Cruse. The plant is a vigorous grower and very healthy, making lots of runners; blooms early; among the first this year in bloom (May 6th); first ripe June 6th. Set an immense crop this year, and good size, conical, firm. Very rich in pollen. A good fertilizer for early pistillates. A bright scarlet in color and of good quality.

Clyde, (S.) This is a seedling of the Cyclone, grown by Dr. Stayman of Kansas, and sent me some four years ago. The first berries were as large as Bubach and the plant as productive as Haverland or Crescent, and the berry very much firmer than either. In fact the Clyde is one of the finest of berries. It is what I call a second early, coming in just after Michel's or Van Dieman. The plant is perfect in every respect, and is one of the most healthy, no sign of rust or disease about it. Strong and long roots. It grows very much like its parent, but very much stronger. It also resembles the Haverland, but its fruit stalks are not so long and are very much stronger, and so are able to hold up its fruit. In fact it has a perfect fruit stalk, strong and just the right length and not too short like the Bubach. The plant in color is very much like Cyclone and Haverland. The fruit is a good scarlet. In shape it is roundly conical. I have fruited it four years, and have tested it in dry seasons as well as the past favorable one; and in my opinion it has come to stay, and will take a first place. It is a strong staminate, rich in pollen.

Della, K., (S.) A seedling of Sharpless by E. B. Stevenson, Ontario. The plant is one of the most vigorous growers, strong and healthy. The berry when grown on rich soil is one of the most beautiful that can be imagined. It is perfect in shape (see cut of it in *Horticulturist* for September, 1896); of finest color, good quality. We are giving it another test to decide productiveness. In bloom May 22nd; ripe June 18th.

Eleanor, (S.) Chance seedling from New Jersey by Mr. Coombe. The plant is small and slender, but very healthy and vigorous, making many runners; good rich color; fruit heart shaped, regular in shape; quite productive; good quality and quite firm; ripens its crop early, a good one. In bloom April 30th; first picking May 29th. Worth trying by all growers.

Enormous, (P.) This comes from Illinois, grown by Mr. Curtis from seed of the Crescent. The plant is healthy and a good grower, quite productive, but the berries were quite irregular in shape. In bloom May 18th. Will give it another trial before I say much about it, but I am not very favorably impressed with it.

Greenville, (P.) Originated in Ohio. A chance seedling found by Mr. Benebly. This is a second Bubach, but a better grower and plant maker; plant very healthy and vigorous. It is if anything more productive than Bubach, the berry about the same size, and same in firmness. It is a good one. No one can go wrong in planting Greenville. In bloom May 14th; first picking June 9th.

Glen Mary, (S.) A chance seedling found by J. A. Ingram of Pennsylvania. The plant is a strong, healthy, vigorous grower. I should say it was very productive if I may judge from the few plants I had to fruit. In bloom May 16th; first picking June 13th. Fruit of very large size and good quality; crimson in color. I should say it was a good one; will be better able to say after another year's fruiting.

Haverland, (P.) Originated in Ohio by Mr. Haverland ; parentage unknown. The plant is very healthy and is a vigorous grower, sending out strong runners. Its foliage is magnificent. The fruit stalk is very long and often not able to bear up the great load of fruit the plant matures. The fruit is large to very large, long ; bright scarlet ; medium in firmness ; flesh pinkish ; sweet and good quality and season. It is one of the first to ripen, and continues all through the season. It succeeds in all kinds of soil. In bloom May 6th ; first picking June 1st.

Howard's No. 501, (S). This was grown from seed of Jersey Queen fertilized with pollen from Wilson by A. B Howard, of Massachusetts. The plant is small, but very healthy and vigorous. I can speak very favorably of this kind from one year's fruiting. (Not for sale yet.)

Howard's No. 41, (P). This also was originated by Mr. Howard of Massachusetts. It is from Haverland crossed with Belmont ; a good strong grower ; fruit large, bright crimson in color, good quality. In bloom May 14th ; first picking June 12th. It is worth a trial. (Not yet offered to the public).

Jersey Queen (P). A good late variety ; in fact with me it is the latest. Fine healthy foliage, good grower. Fruit is large, round and bright scarlet in color and glossy bringing the highest price in the market. First picking this year June 15.

Kossuth, (S). Seedling of Warfield from Kansas. Plant rusts somewhat. In bloom May 10th, first picking June 3rd ; fruit large, flesh white, quite productive. Its greatest weakness is its rusting of the foliage.

Lord Sheffield, (S). This is a variety from England. Plant, a good grower, but has some rust. The fruit is good size, and of good shape and color, and quite productive. It is a good early kind. In bloom May 8th, first picking June 6th.

Longfield, (P). This was grown by Dr. Stayman from seed of Warfield. It is a vigorous grower, making wide row. The plant is healthy and productive. Size of berry medium to large. and quite firm. It is regular in shape and of a rich, dark color. A good market sort. In bloom May 20th ; first picking June 6th.

Michel's Early, (S). A fine grower, making far too many plants. In bloom May 1st, first ripe, May 30th. I never saw the Michel's do better than this year. Set a very fair crop of good sized berries, which with the good prices they sold for made this variety a profitable one this year.

Margaret, (P). This was grown from seed of the Crawford by Mr. Beaver, of Ohio, and not by Mr. Crawford, as previously stated. A very large, strong plant sending out the largest runners of any sort ; plant healthy ; fruit is large, regular ; crimson in color ; quite productive ; of good quality. In bloom May 12th, first picking June 8th. A good one, being offered for sale in spring of 1897.

Marshall, (S). From Massachusetts. The plant is large, stools somewhat, does not send runners out freely unless it is petted, and in very rich ground ; rusts somewhat, sometimes badly. The fruit is of the largest, dark red ; good shape, and of best quality, but not very productive. A good sort for amateurs to grow show-berries from, but not of much use for market growers.

Rio, (S). Seedling of Sharpless, from Virginia. Plant is a good grower, making many runners. In bloom May 18th, first picking June 6th. Fruit firm, good quality ; flesh red, stem short. Bright scarlet ; good productive. Worth a trial.

Ruby, (S). The Ruby originated by Mr. Riehl, of Illinois. It is a grand plant, being a fine grower and healthy, with fine large fruit and a good lot of it ; of very good quality. Well worth a trial by everybody. The fruit is as large as Bubach, and is more regular in shape (roundly conical) ; it is darker in color and red flesh all through ; roundly conical. I think it will take a place among the first. A staminate or perfect flowering kind.

Saunders, (S). Grown by Mr. Little of Ontario. One of the best market sorts. The plant is a good vigorous grower, making many plants, and healthy. The fruit is

large and fine, color bright crimson and of best quality, ripening evenly. It blooms late, and thus often escapes the spring frosts, but it ripens in mid season; it is very produc, tive. It is not so well known as the Williams, but in my opinion it is far better in every respect. It is a very firm berry, and I would advise market growers to try it.

Smith's Seedling, (S). Plant, a rampant grower. The plant is very healthy, making many runners. In bloom May 3rd, ripe June 2nd; very productive for an early one; fruit large; flesh white. Seeds depressed scarlet in color; quality fair; medium in firmness

Staples, (S). A seedling of Warfield from Ohio, by Mr. Staples. Plant quite healthy, making plenty of runners; quite vigorous, fruit dark crimson, flesh pink, firm and good flavor. Color very like Warfield, and can be picked in same basket. A good one to fertilize Warfield with or any other early pistillate. In bloom May 8th; ripe June 1st. A good one.

Stone's Early, (P). Comes from Illinois; grown by C. C. Stone. It is a seedling of the Crescent. The plant is healthy and a good grower. The fruit is a bright scarlet, conical in shape, but small in size. It is quite productive. The berry is soft but of good quality. There are other early kinds very much better. In bloom May 6th; first picking June 5th.

Tennessee Prolific, (S). A seedling from Crescent crossed with Sharpless from Tennessee. The plant is a healthy vigorous grower, and very productive, taking after the parent Crescent in this respect. The fruit is large and of good quality. It is bright scarlet in color; one of the best market berries. In bloom May 12th; first picking June 9th.

Timbrell, (P) Chance seedling from New York by H. S. Timbrell. The plant is strong and healthy, a good grower and very productive. Size medium to large, of the very best quality. The color does not please some, but if plenty of potash is in the soil there will be no trouble with the color. I am pleased with the Timbrell. In bloom May 11th; first picking June 10th, and continued right through for a month.

Van Dieman, (S). From Arkansas grown by J. C. Bauer from seed of Crescent crossed with Capt. Jack. A good vigorous grower. Some rust. Fruit bright crimson in color, very attractive and very firm, and of the best quality; also large in size one of the best extra earlies, being quite productive. In bloom May 5th; first picking May 30th.

Vera, (P). Chance seedling from Guelph, by Mr. Stevenson. Plant very strong and a very healthy grower and vigorous, making a very wide row. In bloom May 14th; first picking June 5th. Fruit stalk short; flesh pink, firm and of good quality. Quite productive.

Warfield, (P). Supposed cross from Crescent and Wilson from Illinois. Plant is a healthy vigorous grower. Small and slender but very vigorous, making almost too many runners; foliage healthy and of dark color. Its fruit stalk is medium; plant is *very productive* of rich dark colored fruit and quite firm. Size of fruit medium to large, all perfect in shape and very regular. It is a good shipper. Quality fair; acid, flesh red, white centre, one of the best market sorts. One of its faults is it can not stand a hot dry season. In bloom May 6th; first picking June 1st.

Wm. Belt (S.) Comes from Ohio, grown by Wm. Belt. The plant is a large and strong one, but rusts every year, sometimes badly. The plant is quite productive of berries of the largest size but not the most regular, but bright color and handsome and of best quality, it will prove I think valuable. In bloom, May 14th; first picking, June 12th; worth a trial.

Williams (S.) Seedling of Sharpless, by Mr. Williams, Ontario, plant very vigorous, short runners; some rust; quite productive, fruit does not ripen evenly. It resembles its parent in this respect; conical in shape, with white rose; large in size; fair in quality, not as good as Saunders or Tennessee Prolific. In bloom, May 24th; first picking, June 14th.

Woolverton (S.) Grown by John Little, Ontario. Plant strong and large; quite healthy, stands dry weather with the best. An early bloomer, but season of fruit is late. The fruit is large and fine looking, of good quality and quite firm for a large berry. Color, dark crimson, but the flesh is white; one of the best fertilizers. In bloom, May 8th; first picking, June 9th.

I have given the time of bloom, as I find mistakes have been made by growers not knowing the time of bloom of the varieties they planted. For instance, I found last season a grower who was trying to fertilize the Haverland with the Williams. He said he was told by the nurseryman from whom the plants were obtained, that the Williams would fertilize the Haverland. Now just look at the time of bloom of the Haverland the past season and of the Williams The Haverland was in bloom May 6th, and ripe June 1st, and the Williams in bloom May 24th. There were some of the Haverland almost ripe before the first blossom of the Williams was open, and all the Haverland fruit was set before Williams was in bloom. How was it possible, then, that the Williams could fertilize the Haverland? If this grower of whom I speak had not had some Michel's Early growing near his Haverland, the result would have been that the justly lauded Haverland would have been a failure with him; but as it was the Michel's accomplished for him what the Williams could never do. No doubt from such causes, *i.e.*, the mismating of varieties, have arisen many of the failures in securing a full crop of strawberries in the past.

I would like to tell you of an experiment I made the past season with unleached hardwood ashes; most of the ashes were made from hard maple. In July and August, 1895, I set out a patch with potted plants. I planted some eighty varieties, the ground was poor, being partly made up of builders' sand and the material dug from a cellar and the refuse after masons and plasterers were through with a building, this was spread over the ground some years ago. It was what I considered very poor soil for a strawberry bed. I planted it, and after frost came on I covered the whole alike with fresh horse manure quite thick, then at different times I applied the ashes.

I set the plot off in three portions, Nos. 1, 2 and 3. On No. 1 I put no ashes; on No. 2 I gave a fair share; but on No. 3 I placed a heavy coat, putting it on at four or five different times; I gave 3 a good dressing just after the frost was out of the ground, I put the ashes on the manure mulch and let the rain and melting snow wash it down to the roots The results were:—

On No. 1 the plants made very little growth, few or no runners, and are not making many now (the middle of July, 1896.) There is not much fruit, and it is a poor quality.

On No. 2, the plants made a very perceptible better growth, and had more runners and considerably more fruit, of a larger and better quality.

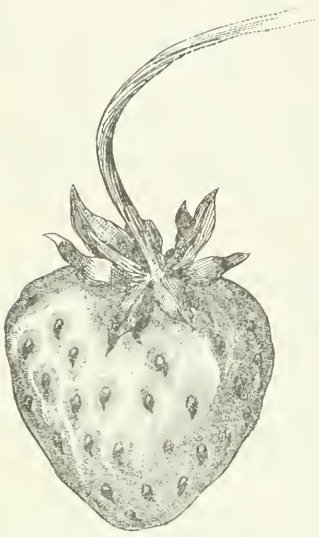
On No. 3 (where I put so much ashes that if there had not been lots of rain, which kept the ground moist, the plants would have burned up I believe), the plants made a wonderful growth, rich in color, glossy and healthy; very many runners thick as a lead pencil, and the fruit was magnificent, some of the finest I ever saw in color and firmness.

The results of the above experiment was very interesting to me. I found that on even poor ground, by a coating of manure as a mulch for winter protection, and a plentiful supply of unleached ashes and lots of rain, or by irrigation, you may have a magnificent crop of high colored and firm berries. On plot No. 3 the plants matured and ripened every berry set, continuing for nearly six weeks in bearing. The Timbrell was grand in plot No 3. There was no trouble about its color then, and the quality was the finest. My wife said it was the finest strawberry she had ever tasted. The aroma also was grand, the finest I ever saw it. It would take a good many ashes to feed a large piece of ground as much as I gave to plot No. 3.

I had several very fine seedlings of which Della K. is one. I have two or three very fine ones of Bubach crossed with Clyde, also Mary crossed with Clyde and two Clyde seedlings. These were picked out of some 400 or 500 that fruited this season for the first time.

Seedlings from Timbrell seed crossed with Marshall and Brandywine.

Timb No. 15 (S.) Grown from seed of Timbrell crossed with Marshall and Brandywine, by E. B. Stevenson, Ontario. Plant large, wealthy and vigorous; fruit is conical in shape, crimson in color, with golden seeds, making a beautiful appearance. Flesh pink, and of good quality and large size, one specimen was $6\frac{1}{2}$ inches round. The cut is the actual size and shape of the berry taken from the plant. In bloom, May 13th; first picking, June 13th.



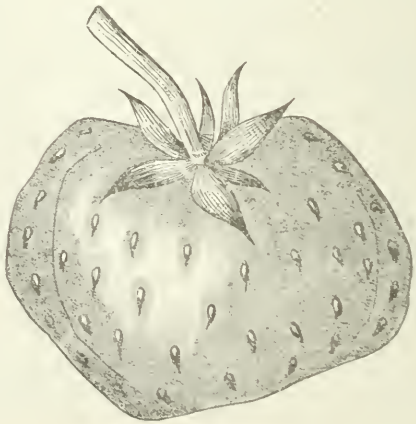
TIMB NO. 10.

TIMB NO. 15.

Timb No. 16 (P.) Grown from same seed as above. The plant is a good healthy strong grower, fine dark color. The fruit is of fine appearance and very large. Crimson in color with golden seeds, and pink flesh. Fine sub-acid flavor, a fine seedling. In bloom, May 13th; first picking, June 13th.

Timb No. 10 (P.) From same seed as No. 15. Plant is a strong, healthy grower, and quite vigorous. The fruit is a beautiful dark red, keeping its color clear to the center

TIMB NO. 16.

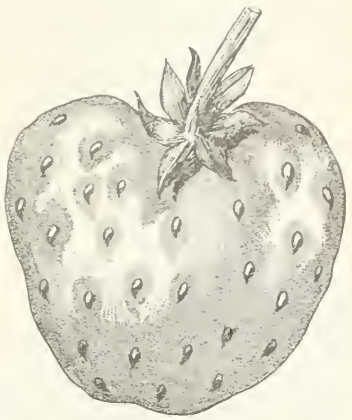


TIMB NO. 18.

of the berry. Very firm; good quality; quite sweet; conical in shape. In bloom, May 10th; first picking, June 8th.

Timb No. 18 (P.) The plant is a large, strong healthy grower, looks very much like its patent Timbrell. The fruit is very large, round, and crimson in color, with golden seeds. Flesh white in centre, firm, and of good flavor. In bloom, May 13th; ripe, June 13th; a fine berry.

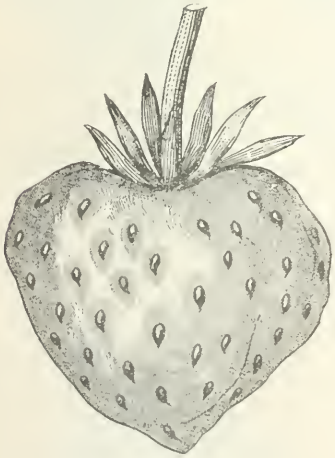
Timb No. 22 (P.) One of the best. The plant is perfect, strong, healthy and a vigorous grower, sending up a strong fruit stalk. The fruit is crimson in color, with red flesh, solid and good quality, and very large; fine large bunch of fruit. In bloom 17th; ripe, June 18th. This would appear to take after the Timbrell in lateness; a good one.



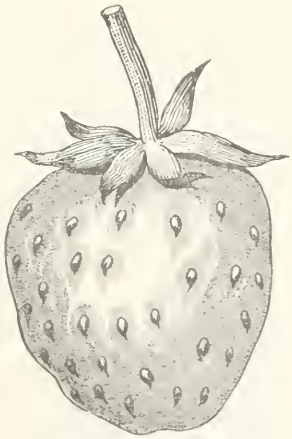
Timb No. 22.

Seedlings from seed of Howard's No. 41, crossed with Marshall and Brandywine.

Howard's 41—"No. 25" (S.) Grown from seed of Howard's 41, fertilized by Marshall and Brandywine. The plant is healthy and a good grower. These seedlings are vigorous growers, which, no doubt, they get from Brandywine or further off from Haverland through Howard's 41. The fruit is crimson, with gold seeds; flesh bright red, and of very good flavor and firm, a fine berry with a slight neck. In bloom, May 14th; ripe, June 13th.



Howard No. 22.



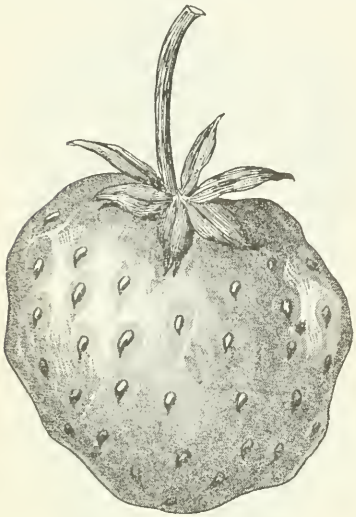
Howard No. 25.

Howard's 41—"No. 22" (P.) From same seed as No. 25 above. This is a very healthy plant, fine vigorous grower. The berry is bright crimson, with gold seeds, making a fine appearance. Flesh red, firm and good quality. Has a beautiful green calix, and is a handsome berry. In bloom, May 13th; ripe, June 13th.

Seedlings of Marshall Seed.

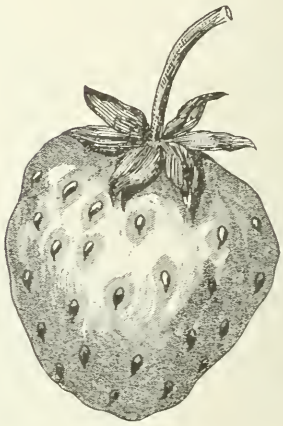
Marshall No. 40.—(S) From seed of Marshall, by E. B. Stevenson. The plant is large, strong and very healthy. The foliage is the largest and the vines the strongest of any kind I know of. The fruit is large and of delicious flavor when fully ripe. It is firm almost as an apple; deep red in the centre—a beautiful berry. In bloom May 8th; ripe June 9th.

Marshall No. 41.—(S) From Marshall. The plant is a good grower, strong and healthy. The fruit, sweet and nice tasting, quite white in the center, with fine color outside. A very nice berry to handle. Very productive. In bloom May 8th; ripe June 6th. I should say this will be a good market one.



MARSHALL No. 40.

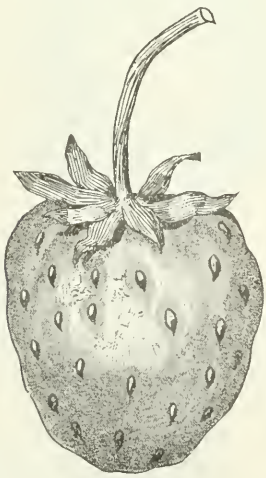
MARSHALL No. 41.



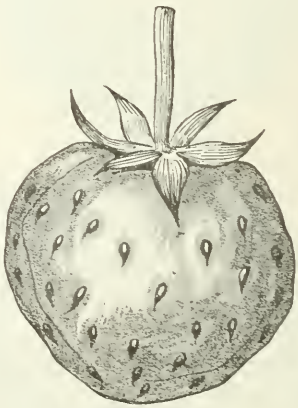
MARSHALL No. 42.

Marshall No. 42.—(S) From same seed as above. The plant is a fine one, strong and healthy. The fruit is of the finest color, delicious tasting and firm, clear to the center. Roundly conical in shape. A very fine berry. In bloom May 7th; ripe June 6th.

Marshall No. 43.—(S) From seed of Marshall. Plant, a fine, healthy, strong grower. Fruit, crimson in color, fine quality and quite firm. A strong, good fruit. In bloom May 12th; ripe June 7th.



MARSHALL No. 43.

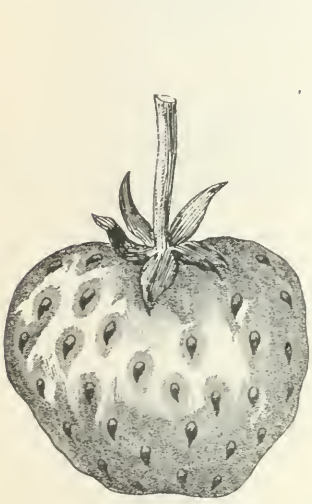


MARSHALL No. 49.

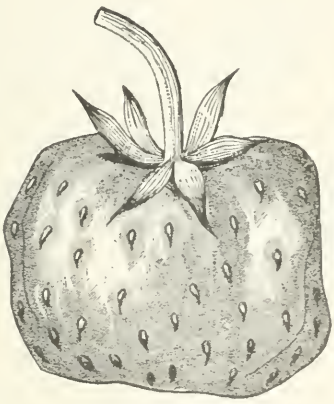
Marshall No. 49—(S) From seed of Marshall. The plant is healthy and a good grower. Fruit a good crimson, pale pink in center, firm and good quality. In bloom May 12th; ripe June 11th. A fine berry.

Stevenson No. 2.—(S) Grown from mixed seed by E. B. Stevenson. The plant is very healthy, a strong vigorous grower. The fruit is bright red, white in the center, quite firm, not overly sweet but pleasant to the taste. The berry is large and fine shape. In bloom May 7th ; ripe June 8th. It is very productive.

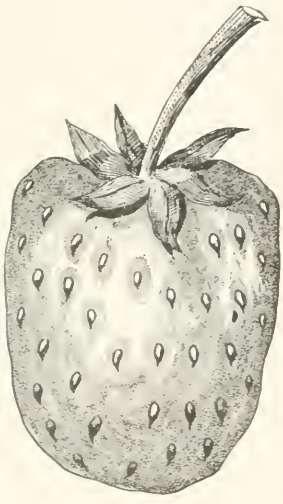
Stevenson No. 10—(P) From mixed seed, as above. The plant is healthy, a good grower, strong and vigorous. The fruit should be classed with the best. Lovely dark red in color, with golden seeds, fine quality and quite firm. In bloom May 7th ; ripe June 8th. A beautiful berry.



STEVENSON No. 2.



STEVENSON No. 10.



STEVENSON No. 65.

Stevenson No. 65.—(S) From mixed seed, as above. Plant healthy, strong grower and vigorous. The plant is light in color, a light yellow. The fruit is fine crimson, with gold seeds, oblong in shape, fine flavor, quite firm and very productive. In bloom May 18th ; ripe June 18th. It is a very late one, it would seem, from the first fruiting ; will have to wait for the second fruiting before we can decide on the point of productiveness. We have a nice patch of each of these seedlings to fruit in 1897. Will then be able to speak of their productiveness. I would like to write more, but must stop by giving a list of the best we had here the past season. It is as follows :

Clyde, Bubach, Ruby, Haverland, Greenville, Saunders, Tennessee, Prolific, Woolverton, Margaret, Carrie, Van Deman, Longfield. Following close after these were Rio, Bisel, Warfield, Lord Shetfield, Berlin, Mary, Cyclone, Beder Wood, Maple Bank, Brandywine and Edith. Glen Mary gives promise of great things.

I have the following to fruit another year before reporting on them :

Varieties	Sex.	Varieties.	Sex.	Varieties.	Sex.
Anery's Seedling	P	Columbia	S	Overholtzer's No. 4	P
Allen No. 13	P	Fountain	S	Pawnee	S
Beedis No. 2		Pet	S	Seedling Superb	S
" No. 1		Nebrings Gem	P	Seedling of Sharpless	
" No. 2		Overholtzer's No. 1	S	Thompson's 104	S
" No. 4		" No. 2	P	Yaboo	S

I have the following new ones to fruit in 1897 :

Varieties.	Sex.	Varieties.	Sex.	Varieties.	Sex.
Apache	S	Ideal	S	Slaymaker's No. 8	
Anna Kennedy	P	Jarabola	S P	Slaymaker's No. 10	
Annie Laurie	S	Lincoln	P	Satisfaction	S
Bismark	S	Mariedan		Seedling Cooper A	
Champion of England	S	Mytrotts		" B	
Evans		Naomi		" C	
Erie	S	No. 1,000		" E	
Glen Mary	S	Noble		Sunrise	
Hayden		Oriole	P	Tubbs	S
Hunn	P	Ocean City	S	Warfield No. 4	P
Holland	P	Premium	P	World's Champion	
Hull's No. 9		Ridgeway	S	Zula	S
Hull's No. 10		Sawlog	P	Michigan	S
Homestead		Sparta			

I have also a lot of Seedlings of the following crosses, made by hand under glass :— Crescent crossed with Marshall ; Princess crossed with Marshall ; Bubach crossed with Howera's 501 ; Mary crossed with Woolverton ; Bubach crossed with Woolverton, and Haverland crossed with Woolverton and Clyde.

E. B. Stevenson, Freeman, Ont.

CHERRIES.—STATION RECORD FOR 1896.

By L. Woolverton, Maplehurst, Grimsby.

Variety.	When planted.	Soil.	Cultivation.	1st and last cherries	Yield in qts.	Average price per qt.	Remarks.
						cts.	
I. Sour Cherries.							
(a) Kentish.							
Early Richmond...	1889	sandy loam ...	well cultiv'd	June 18-25			
Late Kenti h	1860						
Montmorency	1890	" ...	.....	July 1-8 .			
(b) Morellos.							
Morello	1889	" ...	well cultiv'd				
Ostheim	1893	" ...	"	June 27—July 19	....	....	A fine cherry for the north.
Vladimir	1890	" ...	"				
Wragg	1893	" ...	"				
II. Sweet Cher'ies.							
(a) Mazzards.							
Black Mazzards ...	1860	" ...	"				
(b) Hearts.							
Black Eagle	1866	" ...	.....	June 20-25	50	10	Best quality for dessert.
Black Tartarian ...	1866	" ...	.....	June 19-28.....	250	12	Extraord'inary yield in 1896.
Coe's Transparent .	1866	" ...	....	June 16-20... ..	100	8	Too soft.
Early Purple	1866	" ...	in grass	June 8-11.....	144	12-15	The earliest cherry.
Elton	1866	" ...	"	....	.....	.....	Best early cherry.
Governor Wood ...	1866	" ...	"	June 12-15.....	72	6-10	Delicious dessert cherry.
Knight's Early	1866	" ...	"	June 20-25.....	200	10	
(c) Bigarreaus.							
Mezel	1860	" ...	cultivated ..	June 25 30.....	180	12	Finest in size and general appearance for dessert.
Napoleon.....	1866	" ...	.....	June 29	140		
Rockport	1866						
Yellow Spanish....	1860	rich sandy lo'm	grass	June 26-30.....	360	8	Extraordinary yield in 1896; no rot.
Windsor	1893	" ...	.....	July 1-10.			

Note.—Cherry orchard sprayed May 5th, Bordeaux ; May 19th, Bordeaux and Paris green

CHERRIES.

TESTED BY L. WOOLVERTON,

HABIT—S., Spreading; U., Upright; D., Drooping; R., Round; F., Fastigiate. SIZE—S., Small; M., Medium. SUTURE—L., Large; D., Distinct; T., Traceable; Ob., Obscure; Yellow; Yh., Yellowish; d., Dark; b., Bright; Pa., Pale; M.,

Variety.	Origin.	TREE.					FRUIT.			
		Habit.	Vig., scale 1-10	Hardiness, scale 1-10	Productiveness, scale 1-10.	Age of bearing	Size.	Form.	Skin—color.	Cavity.
I. PRUNUS CERASUS	(SOUR CHERRY CLASS)..	.....	..	....	....	....	...	.....	....	.....
(a) *Kentish*	(*Pale red, with uncolored juice*).	.....	..	....	....	....	.....	.....	.....	.....
*Early Richmond.	(Kentish, Pie Cherry, Montmorency) an old European sort.	R., S.	4	10	6	5	S to M	R	b. to d. R ..	M
†Late Kentish....	(Common Red, Pie Cherry, Common sort).	R,, S.	4	10	4	4	S to M	R. flattened.	b. R	M
*Montmorency (large).	Montmorency, France.	R , S.	6	10	8	5	M to L	R , slightly flattened at base.	b. to d. r. R.	M D
(b) *Morellos*	(*Dark red fruits, with dark colored juice*).	.....	..	....	....	....	.....	.....	.....	.....
Morello	(English Morello)	....	..	....	....	..	.....	.....	....	.....
‡Ostheim... ...	Russia	Bush form	4	10	7	....	S to M	R. ob	R. to d R ..	.....
§Vladimir	.....	.....	3	10	3	....	S	R.....	d. P. to B	R S
Wragg.	Wragg & Sons, Waukee, Iowa.	S.	3	10	8	2	M	R....	b. R. to d. R at matur'y	M
II. PRUNUS AVIUM	(SWEET CHERRY GROUP)	.....	..	....	....	....	.....	....	.....	.....
(a) *Mazzards* ...	*European seedling cherries, of vigorous habit*).	.....	..	....	....	....	.....	....	.....	.. ..
**Black Mazzard (wild English).	Europe—especially France and England. The parent of our heart cherries.	U.	10	10	4	....	S	R. H.....	B	S
(b) *Hearts*	(*With soft fleshed heart shaped fruit*).	.....	..	...	....	....	....	....	. .....	.....
Black Eagle	....	.....	..	....	5	....	.....	.....	....	.....
Black Tartarian ..	.....	... ..	...	.	8	....	.....	.....	.....	.....
††Cce's Tr'nspar'nt	.....	R., S.	10	10	5	....	M	R. regular .	b. shining A. nearly covered with b. cornelian R., with peculiar m. blotches.	M wide
‡‡Early Purple ...	(Early purple Guigne), Europe.	U., S.	8	10	7	late	M	R., acute H.	d. R. to P.	S

* Growing in favor for culinary purposes.
† Subject to curculio.
‡ Very desirable for northern sections.
§ No use.

CHERRIES.

MAPLEHURST, GRIMSBY, ONT.

M., Medium; L., Large; V. Very. CAVITY—S. Shallow; N., Narrow; D., Deep; B., Broad; Obs., Obsolete. COLOR—A., Amber; P., Purple; R., Red; B., Black; Y., Mottled. FORM—R., Round; H., Heart shape; Obs., Obscure.

FRUIT.							Qu'l-ity. Sc'le 1-10		Val. Sc'le 1-10.	
Stem—inches.	Suture.	Stone.	Flesh. Color.	Texture.	Flavor.	Season of use.	Dessert.	Cooking.	Home market.	Distant market.
.....	.....	...	.....	.....	.....	.....	..	..	..	..
.....	.....	.....	.....	.....	.....	.....	..	..	..	..
1.....	none	.....	Yh	soft, very juicy	sprightly, tart ..	In 1896, June 20 to June 30 or July 1.	3	9	7	7
.....	.....	....	.....	tender, juicy .	very acid	July 1 to 10	2	7	6	6
1¼ to 1½, stout.	none	.....	Yh	soft, very juicy	sprightly, tart, milder when very ripe	July 1 to 10	3	9	7	7
.....	.....	.....	.....	.....	.....	.....	..	..	..	..
.....	.....	.....	.....	.....	.....	.....	..	..	..	..
1½ to 1¾ in ones and twos on previous years wood	none	S	d r. cling ...	tender, juicy, melting.	almost sweet when ripe—agreeable.	July 8 to 15	4	8	7	7
1½ scattered.	.....	S	p. dark color'd juice	melting, juicy.	sub-acid, fair ...	July 6 to 10	..	3	2	2
1¾ in twos and threes.	.....	.....	.....	.....	.....	July 8 to 16	..	..	..	..
.....	.....	.....	.....	.....	.....	.....	..	..	..	..
.....	.....	.....	.....	.....	.....	.....	..	..	..	..
long and slender.	.....	...	.....	.....	.....	July 1 to 10, in 1896.	...	2	2	..
.....	...	.....	.....	.....	.....	.....	..	..	..	..
.....	.....	.....	.....	.....	.....	.....	..	..	..	..
1½.....	obs.	.....	very pale yellowish tint.	soft, juicy....	sweet, excellent.	June 15 to 20	7	6	6	2
long, 2	obs.	.....	R. to P	tender, juicy .	sweet, pleasant .	June 10 to 15.	8	2	8	8

** Some seedlings are large and fine and the fruit is marketable.
†† Too tender for shipment.
‡‡ Much eaten by birds; profitable on old trees if allowed to ripen fully.

CHERRIES.—*Continued.*

Variety.	Origin.	Tree.					Fruit.			
		Habit.	Vig., scale 1-10.	Hardiness, scale 1-10.	Productiveness, scale 1 10.	Age of bearing.	Size.	Form.	Skin—color.	Cavity.
Elton										
*Governor Wood	Prof. Kirtland, Cleveland, O.	R reg.	8	10	9	3—4	M to L	Obs. H	Light Y., marbl'd and shaded with light to d. R	B
Knight's Early.										
(c) *Bigarreau's*	(*Hard fleshed, mostly light colored, and heart shaped*).									
†Mezel	(Bigarreau of Mezel), Europe.	W., S.	10	10	9		V L	Ob. H. une'n	d. R. to B.	M D
‡Napoleon		U., S.	9	10	10		L to V L	Ob. H	A., blotched and suffus'd with d. R.	B D
Rockport										
Windsor										
§Yellow Spanish Bigarreau).	Europe to America in 1800.	L o w head.	10	10	6		L to V L	R. Obl. H. flattened at base.	Clear waxen A., nearly cov'r'd with R. on sunny side.	M B
Dukes	(*Tree of upright vigorous growth, fruit mostly acid or subacid*).	U. S.								
Hortense										
Late Duke										
**May Duke		UFD.	9	10	6		M	R. Ob. H	b. s. R. to d. R.	M

* Best early dessert cherry.
† Finest and most showy.
‡ Subject to rot in wet seasons; perfect in 1896.
NOTE.—*Hardiness* in the above table refers to the Niagara District only. North of Toronto these sweet cherries are not hardy.

CHERRIES.—*Continued.*

Fruit.							Quality. Scale 1-10.		Val. Scale 1-10.	
Stem—inches.	Suture.	Stone.	Flesh. Color.	Flesh. Texture.	Flesh. Flavor.	Season of use	Dessert.	Cooking.	Home market.	Distant market.
1 to 1½	evid't		Yh	tender, juicy	sweet, aromatic, delicious.	June 15 to 20	8	7	7	4
1½ to 2, slender.			R	firm, breaking, juicy.	sweet and good	June 25 to 30	8	7	10	10
1⅛	T		Pa. Y., with red cheek.	firm, meaty, fairly juicy.	sweet, agreeable	July 1 to 6	8	8	9	9
stout, 1½ to 2	T		pale Y	firm, breaking, juicy.	S, pleasant, delicious when ripe	June 25 to 30.	8	8	8	8
1½ to 2½	T	S	R	tender, very juicy.	sub-acid, v. good	June 12 to 20	7	10	9	

§ Inclined to rot; fruit does not set well; drops badly.
** Fruit in cluster—ripens unevenly.

PEARS.

Tested at East Central Station, Whitby,

HABIT.—S., spreading; U., upright; D., drooping. CAVITY.—S., shallow; N., narrow; D., deep; R., red; Rus., russet; Sun, or sunny side. BASIN.—B., broad;

Number.	Variety.	Origin.	Tree.		Fruit.			
			Habit.	Age of bearing.	Size.	Form.	Skin. Color.	Cavity.
1	Bartlett	Berkshire, England, 1770	U.S.	4	L	obt., obl. pyr	yellow	S
2	Beurre Clairgeau	Nantes, France	U	4	L	pyr.	fawn and b.	U
3	Beurre d'Anjou	French	U.S.	10	L	obt, pyr.	gr.	B
4	Beurre Superfine	France in 1837	U	10	M	r, pyr	gr., rus	S
5	Beurre Antoine	French	U.S.	8	S	obv., pyr	y., gr.	S
6	Belle Lucrative	Flemish pear	U	6	M	obv., glob.	y. g.	S
7	Brockworth Park	English	U	5	L	obl., obt., pyr	y. rus	S
8	Buffum	Rhode Island, U.S.	U	9	M	obl., obv	y. b.	S
9	Clapp's Favorite	Dorchester, Mass., U.S	U.S.	10	L	obv., ov., pyr	lemon y	S
10	Doyenne d'Ete	Van Mon's Seedling, 1823	U	6	S	r., oov	y. and r.	S
11	Duchess d'Angouleme	Angers, France	U	9	V.L	obl., obv.	gh. y	D
12	Flemish Beauty	Belgium	U.S	6	L	obv., obl., pyr	rus. and g.	N
13	Glout Morceau	Flemish	U.S.	8	V.L.	obv., obl. pyr	yh. g	S
14	Goodale	Saco, Me.	U.S.	9	L	obl., obv	yh. g	D
15	Graslin	French	U.S.	10	M.L	obv., ov., obl., pyr.	gh. y	S
16	Grey Doyenne		U.S.	5	S	obv., ov.	y. with bl	N
17	Howell	New Haven, Conn.	U	5	M.L.	r., pyr	y	S
18	Josephine d'Malines	France	S	4	S	r., obl.	gh. y.	S
19	King Sessing	Phil., Pa	U	5	L	obt., pyr	gh. y.	S.N.
20	Keffer's Hybrid	Roxbury, Pa	U	3	M	r., ov., obl, pyr.	orange y.	M
21	Lawrence	Flushing, Long Island	S	8	M	obl., obt., pyr.	light g	S
22	Louise Bonne	France	U	5	L	obl., pyr.	pale g. and r	none
23	Mount Vernon	Roxbury, Mass	U	6	M.L	r., obt., pyr.	light rus.	none
24	Pres. Drouard		U.S.	3	L	obl., obv., pyr.	yh. g	N
25	Rostiezer	Foreign	U	4	S	obv., obl., pyr.	yh. g., r. sun	none
26	Ritson	Oshawa, Ont.	U	4	M	obv., ac., pyr	yellow	S
27	Souvenir de Congres	Lyonaise, France	U	6	L	obl., obt., pyr.	yellow	D
28	Tyson	Inkertown, Penn	U	8	M	ac., pyr	clear deep y.	N
29	Sheldon	Wain Co., N.Y	v'ry U	8	L	r., obt, obv.	rus. g. y.	D
30	Winter Seckel	Fredericksburg, Pa	U	5	S	obv	gh. y	S
31	Winter Nelis	Flemish pear	U.S.	4	S.M.	r., obv	gh., y. with rus.	N

PEARS.

Ont.—R. L. Huggard, Experimenter.

B., broad. Color —B., brown ; G., green; Gh., greenish ; Y., yellow; Yh., yellowish ; B'., blush ; D., deep; M , medium ; Sh., shallow ; Sm , small ; Sl., slight.

Number.	Fruit.						
					Flesh.		
	Stem.	Basin.	Calyx.	Core.	Color.	Texture.	Flavor.
1	1¼ inch..	shallow ..	open	medium	white ..	mellow	vinous sweet.
2	¾ in. stout	irregular .	open	small.	yh	firm, crisp.....	sugary, vinous.
3	¾ in. thick	shallow ..	sm., open.	small.....	wh....	crisp, juicy	brisk, vinous.
4	½ in. stout	small	part closed	small.....	wh	buttery	vinous, sub-acid.
5	1 inch....	shallow ..	open	medium	w.....	buttery	sweet.
6	1¼ inch ..	small	open	small.....	w.....	juicy, sugary	acid, delicious.
7	1 in. thick	small	closed	small.....	w.....	buttery, melting.....	rich and juicy.
8	1 inch....	medium .	small	small.....	w.....	firm, buttery	sweet and good.
9	1 inch....	shallow...	closed	large	w	fine grained	vinous, perfumed.
10	1½ inch...	slight	sm., open.	small.....	w.....	fine grained	mellow, juicy.
11	1½ inch...	knobby...	closed	large	w.....	crisp, juicy	excellent.
12	1½ inch...	small	small	small. ...	wh	buttery, fine.....	mushy, rich.
13	1 in. thick	deep	open	large	w.....	fine, mellow...	rich.
14	¾ inch....	deep	sm., closed	large	w.....	sweet, firm..	vinous, mushy.
15	½ inch. ..	shallow ..	open	small	yh	juicy, melting	sweet, vinous.
16	½ inch....	shallow ..	sm., closed	.....	w.....	fine grained	buttery, rich.
17	1 inch....	large	open	.....	wh	tender, melting	brisk, vinous.
18	1½ inch...	broad, sh.	sm., open	....	pink &w	tender, crisp..	sweet, aromatic.
19	1¾ inch...	irregular .	closed	.....	w	coarse, granular	sweet, perfumed.
20	¾ inch....	medium ..	open	.....	w.....	coarse, juicy.....	melting, sweet.
21	1 inch....	broad	open	.....	w.....	tender, melting	sweet.
22	1 inch....	shallow...	open	....	gh. w ..	juicy, melting	rich and melting.
23	¾ inch....	shallow...	closed	.....	yh. w..	granular	vinous, aromatic.
24	1 inch...	broad	closed	.....	w.....	firm, crisp.....	sub-acid.
25	2 inches..	small	open	.....	gh. w ..	very mellow.....	sugary, aromatic.
26	1 inch....	small ...	"	... .	w.. ...	firm, melting.....	rich, juicy.
27	1½ inch...	broad	"	.....	w.....	granular, mellow	mushy, rich.
28	1¾ inch...	shallow ..	"	....	w.....	fine, melting	sugary, aromatic.
29	1½ inch...	b., large..	"	.....	w.....	melting, juicy	sweet, vinous.
30	1 inch....	broad ...	"	....	w ..	coarse, granular	sweet, juicy.
31	1½ inch...	shallow ..	"	.....	yh. w..	fine, granular..... ...	sugary, aromatic.

PEARS.

EAST CENTRAL STATION

Number.	Variety.	When planted.	Soil.	Cultivation.	Fertilizer used.	Weather favorable or unfavorable.	Pruning.	
							Date.	Method.
1	Pres Drouard	1887	clay loam.	cultivated	stable manure.	dry	March, '96	cutting suckers.
2	Souv. du Congres	1887	"	"	"	"	"	"
3	Duchess d'Angouleme.	1887	"	"	"	"	"	"
4	Beurre d'Anjou	1889	"	"	"	"	"	"
5	Beurre Clairgeau	1891	"	in grass	coal ashes	"	"	"
6	Beurre Superfine	1887	"	"	"	"	"	"
7	Belle Lucrative	1889	"	"	"	"	"	"
8	Tyson		"	cultivated	manure	"	"	"
9	Buffam	1889	"	meadow	ashes	"	"	"
10	Ritson	1892	"	cultivated	manure	"	"	"
11	Keiffer	1887	"	meadow	ashes	"	"	"
12	Brockville Park	1889	"	cultivated	manure	"	"	"
13	Mt. Vernon	1889	"	meadow	ashes	"	"	"
14	Josephine d'Malines	1890	"	cultivated	manure	"	"	"
15	Beurre Antoine	1889	"	"	"	"	"	"
16	King Sessing	1889	"	meadow	"	"	"	
17	Doyenne d'Ete	1889	"	in grass	stable manure	"	Spring, '96	thinning suckers
18	Rosteizer	1889	"	"	"	"	"	"
19	Grey Doyenne	1889	"	"	"	"	"	"
20	Clapp's Favorite	1887	"	"	coal ashes	"	"	"
21	Bartlett	1887	"	"	"	"	"	"
22	Louise Bonne de Jersey	1887	"	"		"	"	"
23	Sheldon	1876	"	cultivated	stable manure	"	"	"
24	Howell	1889	"	in grass	ashes	"	"	"
25	Winter Nelis	1889	"	"	"	"	"	"
26	Flemish Beauty	1876	"	cultivated	stable manure	"	"	"
27	Winter Seckel	1889	"	in grass	coal ashes	"	"	"
28	Graslin	1889	"	"	"	"	"	"
29	Goodale	1887	"	"	"	"	"	"
30	Lawrence	1889	"	"	"	"	"	"
31	Glout Morceau	1889	"	"	"	"	"	"

PEARS.

RECORD FOR 1896.

Number.	Date of maturity.	Date of gathering.	Yield.	Grade per cent.			Storage.	Average price.	Remarks.
				Class 1.	Class 2.	Class 3.	Place.		
1	Dec., Jan..	Oct. 12..	4 baskets...	85	15	....	barn cellar	not sold....	....
2	September .	Sept. 15..	3 " ..	70	30	.....	"	35c. basket.	....
3	October	Oct. 2..	2 " ..	60	40	.....	"	not sold....	....
4	Oct., Nov..	Oct. 10..	1 " ..	90	10	....	"	"	.....
5	Oct., Jan ..	Oct. 2..	½ " ..	90	10	....	.....	.....	Small crop, but very nice fruit.
6	October	Oct. 17..	3 " ..	70	30	...	barn cellar	not sold....	.....
7	last of Sept.	Sept. 15..	4 " ..	65	35	....	"	"	....
8	Aug., Sept.	Sept. 3..	4 " ..	75	25	.....	.....	35c. basket.	... .
9	September..	Sept. 20..	2 " ..	80	20	.....	.....	30c. "	Sold as soon as pkd.
10	November .	Oct 8 ..	1 " ..	100	.....	.....	barn cellar	.....	....
11	Nov. & Dec.	Oct. 16..	9 " ..	75	25	.....	"	$3 barrel. .	....
12	Dec. & Jan.	" 19 .	2 " ..	70	20	10	"	not sold....	Tree too shaded.
13	Nov. & Dec.	" 9..	1 " ..	60	40	.....	"	"	....
14	Jan., Feb..	" 15..	2 " ..	75	25	.....	"	"	....
15	September..	Sept. 10..	2 " ..	70	30	.....	"	35c. basket.	....
16	September..	" 10..	2 " ..	75	25	.....	"	40c. basket.	.....
17	last of July.	July 20..	6 " ..	80	20	.....	.....	10c. quart..	Sold as soon as pkd.
18	Aug. & Sep.	Aug. 24..	4 " ..	90	10	.....	.....	60c. basket.	"
19	July	July 27..	2 " ..	80	20	.....	.....	50c. "	"
20	August	Aug. 20..	14 " ..	70	30	.....	.....	$1.75 bbl...	"
21	September..	Sept. 7..	1 " ..	60	40	.....	barn cellar	35c. basket.	....
22	Sept. & Oct.	" 23..	¾ " ..	75	25	.....	"	$2 barrel ...	....
23	Oct. & Nov.	" 26..	1 " ..	60	40	.....	"	35c. basket.	.....
24	Sep. & Oct.	Oct. 1..	3 " ..	70	30	.....	....	25c. "	.....
25	Dec. & Jan.	" 3..	2 " ..	70	30	.....	barn cellar	30c. "	.....
26	Sep. & Oct.	Sept. 19..	9 " ..	60	40	.....	"	30c. "	....
27	Jan. & Mr'h	Oct. 1..	1 " ..	75	25	.....	"	35c. "	....
28	Oct. & Nov.	" 2..	2 " ..	100	.....	.....	"	not sold....	....
29	Oct. & Nov.	" 2..	3 " ..	85	15	.....	"	"	....
30	December ..	" 19 .	2 " ..	10	30	.....	"	"	....
31	December ..	" 5..	3 " ..	90	10	.....	"	"	.....

PEARS.

BURLINGTON STATION RECORD FOR 1896.—

Variety.	Origin.	When planted.	Soil.	Cultivation.	Fertilizers used.	Weather favorable or unfavorable.
1. Anjou	Belgium....	1880	clay loam ..	Plowed once a year in the fall or spring, then clean cultivation until last of July. Seeded down once in every two or three years to check growth of wood.	On dwarf trees a good deal of stable manure; on standards on clay soil, also stable manure once in two years.	unfavorable.
2. Belle Lucrative	"	1889	grav. loam..			"
3. Bartlett	England ...	1880	clay loam ..			"
4. Clapp's Favorite	Massachusetts	1889	grav loam..			"
5. Duchess d'Angouleme	France	1889	grav. loam..			"
6. Flemish Beauty	.....	1880	clay loam ..			"

PLUMS.

GEORGIAN BAY STATION.—JOHN

HABIT.—S., Spreading; U., Upright; D., Drooping. FORM.—Ov., Oval; Glob., Globular. SUTURE.—Gh., Greenish; Gol., Golden;

Variety.	Origin.	Tree.			Fruit.	
		Habit.	Foliage.	Age of bearing.	Size.	Form.
Yellow Egg	....	U	healthy, medium quantity.	5	L	ov .....
Yellow Gage	.....	U	healthy, plentiful	4	M	ov .....
Howard's Favorite..	E. Door, Albany, N.Y..	S to U	large size, medium quantity.	3	L	ov., narrowing toward stem.
Prince of Wales	English	U	medium quantity	5	L	glob .....
Early Black Damson	.....	S	healthy, medium quantity.	3	S	ov .....
Jefferson	Judge Bell	U	large and plentiful.....	5	L	ov .....
Peach	....	S to U	large leaves, medium quantity.	4-5	L	roundish, much flattened at ends.
Duane's Purple.....	James Duane, Duanesberg, NY.	U	healthy, medium in size and plentiful.	4-5	M to L	ov. to obl ..

COMMERCIAL VARIETIES.

A. W. Peart, Freeman, Experimenter.

Pruning.		Insects.		Fungi.		Date of gathering.	Remarks.
Date.	Method.	Name.	Treatment.	Name.	Treatment.		
March..	Heading back young trees up to 5 or 6 years old, to	Slug, codlin moth, curculio.	Paris green	Blight bacteria.	Cutting out and burning.	Oct. 10 20.	....
" ..	make them stocky	"	"	"	"	Sept. 15..	.....
" ..	and more compact	"	"	"	"	" 1..	Blighted badly
" ..	in the top, and cutting out cross branches.	"	"	"	"	Aug. 20..	"
" ..		"	"	"	"	Oct. 15	.....
" ..		"	"	"	"	Sept. 10.	.....

PLUMS.

Mitchell, Clarksburg, Experimenter.

L., Large; D., Distinct; Ob., Obscure; Obs., Obsolete. Color.—Cr., Crimson; P., Purple; R., Red; Rh., Reddish; Y., Yellow.

Fruit.—*Continued.*

Skin.		Cavity.	Stem.	Suture.	Stone.	Flesh.		
Color.	Bloom.					Color.	Texture.	Flavor.
Y	W	S and N	long.....	L	cling	Y	coarse....	rather acid.
Y	W	S	slender	Ob	cling	Y	juicy	rich.
pale Y dotted with Cr.	thin lilac	D and N	long.....	D	cling	Y	juicy	sweet.
R P	thick	I and N	short	D	nearly free .	Gh Y	juicy	sweet.
dark P	thick blue	.....	short	Ob	nearly free .	Y	juicy	rather tart.
gol. Y	thin white	S	long.. ...	Ob	free	deep orange	juicy	rich, sweet.
pale Y	pale	N	short	D	free	Pale Y	juicy	sprightly.
R P	lilac	N	¾ in. long, slender.	D	partial cling	amber	juicy	moderately sweet.

PLUMS.

NIAGARA FRUIT EXPERIMENT STATION.—

HABIT.
S.—Spreading.
U.—Upright.
D.—Drooping.

CAVITY.
S.—Shallow.
N.—Narrow.
D.—Deep.
B.—Broad.

SUTURE.
L.—Large.
D.—Distinct.
Ob.—Obscure.
Obs.—Obsolete.

Variety.	Origin.	Tree.			Fruit.			
							Skin.	
		Habit.	Foliage	Age of bearing.	Size.	Form.	Color.	Bloom.
Prince's Yellow Gage	Mr. Prince, Flushing, L.I.	U.	lightish green, glossy	4	M	Ov	light Y	thin
Goliath		U.	healthy, abundant	5	L	R obl	R P	wh. thin
Jefferson	Judge Buell	S.	lightish green		L	Ov	Y, R cheek	light
Prince of Wales	English	S.	plentiful, healthy	4	M-L	r obl	R P	heavy
Orange	Dutchess Coy. N.Y	U.	dark, abundant	5	L	r ov	deep Y, dotted with W	m. whitish blue, thick
Moore's Arctic		S.	not luxuriant	3	S-M	Ov	Bl	
McLaughlin	Bangor, Maine	S.	broad crimped	5	M-L	R	Y marbled with R	light
Onlands' Golden Gage	European	U.	heavy rich green		L	r ov	Y	whitish
Lawrence's Favorite	Seedling of European Green Gage	U.	dark green	6	M-L	R	Yh	thin
Coe's Golden Drop	English	S.	large, abundant	4	L	ov. irreg.	pale Y	thin
St. Catherine	French	U.	medium	5	M	Obov	Y mottled with B	thin
Columbia	Mr. Lawrence, Hudson, N.Y.	S.	abundant, healthy	5	L	R	Bl to P	bluish, heavy
Gueü		U.	crimped, broad	3	M	Con	deep R	heavy blue

PLUMS.

M. Burrell, St. Catharines, Experimenter.

FORM.

Con.—Conical.
Irreg.—Irregular.
Ov.—Oval.
Obl.—Oblong.
Obov.—Obovate.
R.—Round.
r.—Roundish.

COLOR.

B.—Blue.
P.—Purple.
R.—Red.
Gh.—Greenish.
G.—Green.
Rh.—Reddish.
Y.—Yellow.
Yh.—Yellowish.

Fruit.								
Cavity.	Stem.	Suture.	Stone.	Flesh. Color.	Flesh. Texture.	Flesh. Flavor.	Season (Months of use as Dec.-Mar.)	Remarks.
N S....	Slender 1 in.	Ob.	free	Y.....	melting.. ...	sugary, rich	early Aug.	One of the earliest yellow plums.
D N ...	Stout, short	D..	cling ..	deep Y.	juicy	moderately rich...	Aug. 15 ..	
S	1 in. stoutish	Ob.	free ...	rich Y.	melting, juicy.	very rich, luscious.	last Aug..	
D N ...	½ in. stout..	D..	free ...	Y.....	juicy, coarsish	sweet, not very rich	end Aug..	
N S....	Stout 1 in..	D..	cling ..	Y	coarsish	pleasant, sub-acid.	Aug. 20 ..	Often condemned but is very hardy, a good bearer and a good preserving plum.
S N....	⅝ l'g slender.	D..	cling ..	gh. Y ..	firm.....	not rich	early Aug.	
S N....	¾ in. med...	Ob.	cling ..	dull Y .	juicy	very sweet and fine	last Aug..	
D	Medium ...	Ob.	free ...	Y.. ...	firm	sweet, rich	Aug. 10 ..	
D N ...	Slender, sh't	D..	free ...	gh	juicy, melting	rich vinous	Aug. 20 ..	A fine plum for the amateur.
N & M.	1 in. stiff...	D..	cling ..	Y.....	juicy, firmish.	quite rich, delicious	end Sept..	
S N....	¾ in. very slender...	D..	partial cling..	Y	firm....	aromatic sub-acid.	Sept. 10 ..	
D N ...	1 in. stoutish	D..	free ...	deep Y.	firm.....	rich, sugary	Sept. 18..	A fine showy and profitable plum.
D N ...	¾ in. med.	Ob.	partial cling..	gh	firm.....	sprightly	Aug. 20 ..	A promising variety.

DESCRIPTIVE

WENTWORTH EXPERIMENT STATION :

SPECIES.—E. Æstivalis ; R. Riparia ; L. Labrusca ; H. Hybrid ; X. Cross. SIZE.—S. Small ; —C. Close; L. Loose ; St. Straggling. SHAPE OF BERRY.—Ov. Oval : R.

Variety.	Vine.			Bunch.	
	Origin.	Species.	Foliage.	Form.	Compactness.
1 Concord	E. W. Bull, Concord, Mass	L	healthy	Sh	C
2 Delaware	Unknown	H	thin and weak	Sh	C
3 Pocklington	Seedling from Concord	L	healthy	S	C

GRAPES.—WENTWORTH

M. PETTIT, EXPERIMENTER,

*Yield per tree, vine, bush or plant, an average of three ; of strawberries,

Variety.	When planted.	Soil.	Cultivation.	Fertilizers used.	Winter protection.	Pruning.	
						Method	System of training
1 Agawam	1887	Clay	Plowed in the spring, with frequent shallow cultivation after.	none	No winter protection.	Fan system on three wires.	Fan system on three wires.
2 Brighton	1882	"					
3 Concord	1874	"					
4 Catawba	1883	"					
5 Delaware	1874	"					
6 Lindley	1887	"		stable manure			
7 Moore's Early	1887	"					
8 Moyer	1886	"					
9 Niagara	1882	"					
10 Worden	1884	"					
11 Wilder	1884	"		stable manure			
12 Salem	1884	"		"			

LIST OF GRAPES.

M. PETTIT, WINONA, EXPERIMENTER.

M. Medium; L. Large. FORM OF BUNCH.—L. Long; S. Short; Sh. Shouldered. COMPACTNESS. Round. COLOR.—B. Black; P. Purple; R. Red; W. White; L. Light; D. Dark.

Berry.							
Size.	Shape.	Skin. Color.	Skin. Bloom.	Skin. Thickness.	Flavor.	Season. (Months of use, as Oct., Nov.)	Remarks.
large...	R	B	heavy..	thin ...	not the best ..	Sep., Oct.....	If carefully picked and not burst will keep in good condition from three to four weeks, but loses some in quality.
small...	R	R	thin....	thin....	best.....	Sep.½	If carefully picked will keep two or three weeks in a cool dry place.
large.	R	W	thin....	thin....	good	Oct.....	

STATION RECORD FOR 1896.

WINONA, ONT.

an average of twelve. Of grapes and small fruits give weight.

Insects. Name.	Insects. Treatment.	Fungi. Name.	Fungi. Treatment.	Date of maturity.	Date of gathering. (Berries, first and last).	Yield.	Grade per cent. Class 1.	Grade per cent. Class 2.	Average price.	Remarks.
						lb.			c.	
thrip	none .	mildew.	sulphur	Oct. 7	Oct. 15-20....	18	15	3	2½	
....	" .		.....	Sep. 5	Sep. 11	7	7	....	3	Did not fertilize well.
.....	" .		.....	" 8	" 15-20....	18	18	....	1½	
....	" .		.....	Oct. 15	Oct. 20-25....	15	15	....	3	
thrip very bad	" .		....	Aug. 31	Sep. 1-10 ...	12	12	....	3½	
thrip	" .		.....	" 31	" 1-10 ...	14	14	....	3½	
.....	" .		.....	" 27	Aug. 27-31 ...	6	6	....	4	
thrip	" .		.....	" 21	" 21-25....	4½	4½	....	5	
.....	" .	Very little mildew.	.....	Sep. 7	Sep. 7-17 .	16	16	....	2	None of the Rogers, Niagara or Brighton fertilized properly; they bloomed very full and set, but dropped off soon after the bloom.
....	" .		.....	" 1	" 1-10....	17	17	....	2½	
thrip very bad	" .		.....	" 23	" 23-30 ...	15	15	....	2½	
" "	" .		.....	" 10	" 10-20....	16	16	....	3	

GOOSE-

SIMCOE GOOSEBERRY SUB-STATION.—

Size.—S., Small; M., Medium; L., Large. Form.—L., Long; S., Short; Sh., Shouldered. Compact-
Color.—R., Red; B., Black; W., White; G., Green;

Variety.	Plant.				
	Origin.	Foliage.	Vigor. Scale 1-10.	Productiveness. Scale 1-10.	Freedom from mildew 1-10.
Autocrat	Canadian, possibly Eng. origin	Fair	7	8	8
Carnie's Golden	Eng. Seedling	Good	9		9
Champion	Delphi, Ind., U. S.		9	10	8
Champion	Eng.	V. G.	9		10
Chautauqua	Foreign	Fair	8		8
Columbus	Eng. Seedling	Fair	8		8
Crosby's Seedling	Eng. Seedling	Good	9		9
Crown Bob	Eng.	Good	8		8
Downing	American	Fair	8	9	9
Lancashire Lad	Eng.	Fair	7		8
Pearl	Canadian	Good	9	9	9
Queen	German	Good	9		9
Red Jacket	American	V. G.	9		9
Triumph	Eng. Seedling	Good	7	8	8
Whitesmith	Eng.	Fair	8	8	7

GOOSEBERRY SUB-STATION

Stanley Spillett,

Variety.	When planted.	Soil.	Cultivation.	Fertilizers used.	Winter protection.
Autocrat	1890	Clayey	Constant cultivation	Barnyard manure, hardwood ashes, nitrate of soda.	None
Champion	1893	"	"	"	"
Chautauqua	1894	"	"	"	"
Downing	1886	"	"	"	"
Lancaster Lad	1893	"	"	"	"
Pearl	1892	"	"	"	"
Queen	1894	"	"	"	"
Red Jacket	1894	"	"	"	"
Triumph	1894	"	"	"	"
Whitesmith	1890	"	"	"	"
Carnie's Golden	1895	"	"	"	"
Crosby's Seedling	1895	"	"	"	"
Crown B. & B	1895	"	"	"	"
Champion	1895	"	"	"	"
Columbus	1895	"	"	"	"

BERRIES.

S. Spillett, Nantye, Experimenter.

ness.—C., Close; L., Loose; St., Straggling. Form of Berry.—R., Round; Ov., Oval; Ob., Oolong. Y., Yellow. Season.—E., Early; M., Medium; L., Late.

Berry.					Value. Scale 1-10.		Remarks.
Size.	Form.	Color.	Flavor.	Season.	Dessert.	Market.	
V. L.	Ob	G	V. G.	L	10	10	
L	Ov	G	G		9	10	Promising.
M	Ov	G. W.	Fair	M	6	8	Lowered one point for mildew.
M	Ov	G. W.		M			
L	Ov	G. W.	G	M	9	10	
							Promising.
M	R	G. W.	G	M	9	8	
L	Ov	R	V. G.	E	10	10	
M	R	G. W.	G	M	9	10	
L	Ov	G. W.	G	M	9	10	
L	R	R	G	M	9	10	
V. L.	Ov	G. W.	G	M	9	10	
V. L.	Ob	G. W.	G	M	9	10	

RECORD FOR 1896.

Nantye, Experimenter.

Weather favorable or unfavorable.	Pruning.		Insects.		Fungi.	
	Date.	Method.	Name.	Treatment.	Name.	Treatment.
Unfavorable; early part of season very dry.	24th October	Clearing away all branches underneath; thinning out heads; leaving about six stems.	Currant worm	Sprayed with Paris green.	Mildew	Liver of sulphur and Bordeaux mixture.
"	"	"	"	"	"	"
"	"	"	"	"	"	"
"	"	"	"	"	"	"
"	"	"	"	"	"	"
"	"	"	"	"	"	"
"	"	"	"	"	"	"
"	"	"	"	"	"	"
"	"	Shrub system	"	"	"	"
"	"	"	"	"	"	"
"	"	"	"	"	"	"
"	"	"	"	"	"	"
"	"	"	"	"	"	"

BLACKBERRIES.

Tested at Burlington Station.—

Size—S., small; M., medium; L., large. Form.—R., round; C., Conical; O., ovate. Color.—E., early; M.,

Variety.	Plant.						
	Canes.						
	Habit of Growth.	Color 2nd Nov.	Freedom from disease 1-10.	Foliage.	Vigor. Scale 1-10.	Hardiness. Scale 1-10.	Productiveness. Scale 1-10.
Agawam	up. spr.	br. red..	9	healthy.	8	10	7
Early Cluster	up	br.	9	"	8	10	3
Early Harvest	up	br.	9	"	8	6	4
Erie	spr.	br	9	"	7	10	8
Gainor	up.	br	9	"	8	10	8
Kittatinny	up.	r. br.	9	"	9	10	10
Lovett's Best	up.	light br.	9	"	9	10	5
Maxwell	we'k.spr	r. gr.	9	"	5	10	8
Ohmer	up. spr.	r. br.	10	"	8	10	8
Snider	up.	dark red	10	"	9	10	10
Stone's Hardy	up. spr.	br.	9	"	8	9	8
Taylor	up.	r. br.	9	"	7	10	9
Wachusetts	spr.	r. br.	9	"	8	10	8
Western Triumph.	up.	r. br.	10	"	10	10	9

BLACKBERRIES.

BURLINGTON STATION RECORD FOR 1896.

Variety.	When planted.	Soil.	Cultivation.	Fertilizers used.	Winter protection.	*Time of blooming.	Date of maturity.	Date of gathering berries (1st and last.)
Agawam	1895	Rich gravelly loam.	See raspberries	none.	none.	June 10.	July 20.	July 20-Aug. 20
Erie	1895	"		"	"	June 12.	July 25.	July 25-Aug. 10
Gainor	1895	"		"	"	June 11.	July 20.	July 20
Kittatinny	1895	"		"	"	June 15.	Aug. 1.	Aug. 1-25
Lovett's Best	1895	"		"	"	June 11.	Aug. 1.	Aug. 1-21
Maxwell	1895	"		"	"	June 13	July 15.	July 15-Aug. 10
Ohmer	1895	"		"	"	June 11	July 20.	July 20-Aug. 10
Snider	1895	"		"	"	June 10	July 25.	July 25-Aug. 15
Stone's Hardy	1895	"		"	"	June 9.	July 25.	July 25-Aug. 15
Taylor	1895	"		"	"	June 8	July 20.	July 20-Aug. 10
Wachusetts	1895	"		"	"	June 9.	July 20.	July 20-Aug. 1
Western Triumph	1895	"		"	"	June 9.	July 20.	July 20-Aug. 12

* The dates here represent full bloom.

BLACKBERRIES.

A. W. Peart, Experimenter, Freeman.

D., dark ; R., red ; P., purple ; O., orange ; B., bright. Flesh.—F., firm ; S., soft. Season.—medium ; L., late.

Berry.					Value. Scale 1-10.		Remarks.
Size.	Form.	Color.	Flavor.	Season.	Dessert.	Market.	
M	O.R.	B.	Insipid	M.	5	6	
S	O.R.	B.	Sprightly	L.	5	5	
S	O.C.	B.	Poor	L.	1	3	
M.L	O.R.	B.	Pleasant	M.	7	8	
V. L.	O.R.	B.	Sweet, sprightly	E.	9	9	Very large berry.
L	O.C.	B.	The best	L.	10	10	
S	O.R.	B.	Poor	M.	5	4	
L	O.R.	B.	Inferior	M.	5	8	Very thorny.
L	O.C.	B.	Good, sprightly	M.	8	8	Very large berry.
M	O.C.	B.	Sweet, good	M.	8	8	
S.M.	O.C.	B.	Pleasant, sprightly	M.	8	8	
M.	O.C.	B	Fine	M.	9	7	Very thorny.
S. M.	O.R.	B.	Fine, sweet	M.	9	7	
M	O.R.	B.	Fine	M.	9	9	Very thorny.

RASPBERRIES—BURLINGTON

A. W. PEART,

SIZE.—S. small; M., medium; L., large. FORM.—R., round: C., conical; O., ovate. SEASON.—E, early;

Variety.	Plant.							
	Canes.				Foliage.	Vigor. Scale 1-10.	Hardiness. Scale 1-10	Productiveness. Scale 1-10.
	Habit of growth.	Color 2nd Nov.	Freedom from disease 1-10.	Propagation by tips or suckers				
All Summer	up. spr.	br ...	9	S	healthy	6	10	8
Columbian	very strong, spr. up...	red	10	T.	very healthy..	10	10	10
Cuthbert	up	dark red	8	S	healthy	9	9	9
Hilborn	up	br.....	10	T.	"	9	10	10
Kansas	up. spr.....	dull red.	10	T.	very healthy..	10	10	10
Lovett	up. spr.....	"	9	S	healthy	8	10	8
Marlboro'	up. spr.....	"	10	S	"	8	10	8
Older	up	br... ..	10	T.	"	9	9	7
Palmer	up	dull red.	9	T.	"	9	10	7
Progress	up	dark red	9	T.	"	8	10	5
Thompson	up	dull red.	10	S	"	7	10	7
Shaffer's Colossal	up	br	10	T.	"	10	10	10

RASPBERRIES—BURLINGTON

Variety.	When planted.	Soil.	Cultivation.	Fertilizers used.	Winter protection.	Weather favorable or unfavorable.
All Summer	1895	Rich gravelly loam....	Ploughed in spring, then frequent cultivation and hoeing until fruit is ripe.	none	none	Too dry during the early part of the season.
Columbian	1895	" "		"	"	
Cuthbert	1894	" "		"	"	
Hilborn	1895	" "		"	"	
Kansas	1895	" "		"	"	
Lovett	1895	" "		"	"	
Marlboro'	1894	" "		"	"	
Older	1895	" "		"	"	
Palmer	1895	" "		"	"	
Progress	1895	" "		"	"	
Shaffer's Colossal	1895	" "		"	"	
Thompson	1895	" "		" ...	"	

* The dates here

FRUIT EXPERIMENT STATION.

REEMAN, EXPERIMENTER.

COLOR.—D, dark; R., red; P., purple; O., orange; B., bright. FLESH.—F., firm; S., soft. M., medium; L., late.

Berry.					Value. Scale 1-10.		
Size.	Form.	Color.	Flavor.	Season.	Dessert.	Market.	Remarks.
M	R.	R.	Aromatic, sweet	E. L.	8	8	Fruits from July to Oct.
M	R.	R.P.	Sweet, sprightly	M ...	7	8	Offers well.
L	R.	R.	Excellent	M. L.	10	10	One of our very best.
M	R.	B.	"	E. ..	9	8	
L	R.	B.	The best	E. ..	10	10	The best black cap here.
M	R	R.	Fair	M. ..	6	8	
L	R.	R.	"	E. ..	7	10	
L	R.	R.	Inferior	E. ..	4	9	
M	R.	B.	Sweet	E. ..	9	8	
S.M	R.	B.	Good	E. ..	8	8	
M	R.	R.	Poor	M. ..	2	7	
L	R.	P	Only fair	M. ..	5	8	

STATION RECORD FOR 1896.

Pruning.		*Time of blooming.	Date of maturity.	Date of gathering (berries 1st and last.)	Yield.	Remarks.
Date.	Method.				lb.	
Annual pruning in early April. Summer pruning in August, of young canes, shortening back to make them stocky, and throw out laterals. Old canes removed in spring at annual pruning.		June 10	July 4	July 4-Oct. 15		Blooms and fruits from June 10 to Oct. 15.
		June 17	July 20	July 20-31	1⅜	
		June 20	July 15	July 15-31		
		June 8	July 1	July 1-10	⅜	
		June 6	July 1	July 1-10	1¼	The best B.R. so far.
		June 17	July 15	July 15-31		
		June 15	July 1	July 1-20		
		June 6	July 4	July 4-13	½	
		June 3	July 1	July 1 15	¼	
		June 3	July 1			
		June 20	July 20	July 20-31	1⅝	
		June 9	July 20	July 20-31		

represent full bloom.

RASPBERRIES—

G. C. Caston,

Size.
S—Small.
M—Medium.
L—Large.

Form.
R—Round.
C—Conical.
O—Ovate.

Color.
D—Dark.
R—Red.
P—Purple.
O—Orange.
B—Bright.

Variety.	Origin.	Plant.								
		Canes.				Foliage.	Vigor. Scale 1-10.	Hardiness. Scale 1-10	Productiveness. Scale 1-10.
		Habit of growth.	Color.	Freedom from disease 1-10.	Propagation by tips or suckers.				
Cuthbert	....	vigorous..	R	9	suckers...	healthy ..	9	7	9
Marlboro'	....	" ..	R	9	" ...	" ..	9	9	9
Golden Queen	Seedling of Cuthbert	fair	P	9	" ...	" ..	8	7	
Shaffer's Colossal	Cross between red and black.	vigorous..	.....	7	tips	M	9	9	9
Columbian	.....	" ..	.....	9	"	healthy ..	10	9	10
Older	.....	" ..	.....	9	"	" ..	9	9	8
Gregg	....	fair	.....	4	"	fair	7	8	8

BLACK

Variety.	Plant.							
	Canes.				Foliage.	Vigor. Scale 1-10.	Hardiness. Scale 1-10.	Productiveness. Scale 1-10.
	Habit of growth.	Color.	Freedom from disease 1-10.	Propagation by tips or suckers.				
Snyder	vigorous..	R	10	suckers...	healthy ..	10	10	9

SIMCOE STATION.

EXPERIMENTER.

Flesh.
F—Firm.
S—Soft.

Season.
E—Early.
M—Medium.
L—Late.

Berry.							Value. Scale 1 10.		Remarks.
Size.	Form.	Color.	Tenacity (i.e. to calyx or receptacle).	Flesh.	Flavor.	Flesh.	Dessert.	Market.	
L....	R....	R...	good	F	good	L ...	10	10	The best red.
L....	R....	R....	"	F	M	E	6	9	
L....	R....	O	"	F	good	M. .	9	9	
L....	R....	D. ..	fair	S	M	M. ..	7	6	Subject to anthracnose.
L....	R....	D. ..	good	M. ..	fair to good. .	Late .	8	9	Very promising variety.
M. ..	R....	Bl'ck.	"	S . .	best.....	L. ..	10	8	Soft but of good quality.
L....	R....	Bl'ck.	"	F	poor	L. ..	5	8	Subject to blight.

BERRIES.

Berry.							Value. Scale 1-10.		Remarks.
Size.	Form.	Color.	Tenacity.	Flesh.	Flavor.	Season.	Dessert.	Market.	
M. .	C. ..	Bl'ck.	good	F	fair	M. ..	7	7	Very hardy, but quality poor.

STRAWBERRIES.

TESTED AT STRAWBERRY SUB-STATION, GUELPH;

Size: S, Small; M, Medium; L, Large.
Form: B, Broad; C, Conical; D, Depressed; I, Irregular; L, Long; O, Ovate; R Round.
Color: B, Bright; C, Crimson; D, Dark; L, Light; R, Red; S, Scarlet.

Number.	Variety.	Plant. Sex.	Origin.	Foliage. Healthy or liable to rust.	Fruit stalk.	Vigor. Scale 1-10.	Productiveness. Scale 1-10.
1	Aroma	S	From Cumberland and by E. W. Cruse, Kansas.	very healthy	M to L	8	9
2	Arrow	P	From Haverland, by E. Cone, Wis	healthy	L	7	6
3	Afton	P	Chance seedling, from New York	quite healthy	M	9	10
4	America	S	From Great American, Virginia	healthy	M to L	8	8
5	Annie Laurie	S	By Mr. Beaur, Ohio	healthy	M to L	8	8
6	Allen	....	By W. F. Allen, Md	healthy	M to L	8	8
7	Allen's No. 6	P	By W. F. Allen, Md	healthy	M	9	8
8	Bubach	P	By J. G. Bubach, Ill	very healthy	S to M	6	9
9	Beverly	S	From Miner's P, by B. M. Smith, Mass.	healthy	M to L	6	7
10	Beder Wood	S	By B. Wood, Ill	some rust	M to L	8	9
11	Boynton	P	From Crescent x Sharpless, N. Y.	healthy	M	9	9
12	Bouncer	S	From Jersey 2 x Miner, by Mr. Ball, Ct.	healthy	M	7	7
13	Bisel	P	From Wilson, by D Bisel, Ill	some rust	S to M	9	9
14	Brandywine	S	From Glendale x Cumberland, by E. Ingram, Pa.	healthy	M	10	7
15	Belle	S	Unknown, by M. T. Thompson, Va	healthy	M to L	7	7
16	Beede's No. 1	S	G. F. Beede, N. H	very healthy	M	8	6
17	Beauty	S	Unknown	very healthy	M to L	8	8
18	Brunette	S	G. Cowing, Ind	healthy	M	7	6
19	Banquet	S	Supposed cross with wild strawberries.	healthy	M	7	6
20	Berlin	P	From Bubach, by J. Harrison, Md	healthy	M	8	8
21	B. No. 3	....	From Buback x Jessie, by E. B. Stevenson, Ont	very healthy	M	9	9
22	Carrie	P	From Haverland, by M. T. Thompson, Va.	healthy	L	9	8
23	Clyde	S	From Cyclone, by Dr. Stayman, Ka	very healthy	M	10	10
24	Cyclone	S	From Crescent x Cumberland, by E. W. Cruse, Ka	very healthy	L	9	9
25	Charlie	P	From mixed seed, by M. Thompson, Va.	very healthy	L	8	6
26	Crescent	P	By Mr. Parmely, Conn	healthy	M	9	10
27	"Della K."	S	From Sharpless, by E. B. Stevenson, Ont	healthy	M to L	9	8
28	Dew	S	From Manchester x Sharpless, by Mr. Dew, Mich	healthy	M to L	7	5
29	Enhance	S	From Windsor C, x Sharpless, by Mr Young, Ohio	healthy	M	9	8
30	Edgar Queen	P	By Mr. Curtis, Ill	some dust	M	7	5
31	Epping	P	By G. Dow, N.H	healthy	M	8	6
32	Enormous	P	From Crescent, by Mr. Curtis, Ill	healthy	M to L	8	8
33	Effie May	S	Unknown, by C. C. Stone, Ill	very healthy	M	8	6
34	Edith	P	Chance seedling, by M. Thompson, Va.	healthy	M to L	7	8
35	Equinox	S	From Mt Vernon, by M. Thompson, Va.	some rust	L	8	8
36	Eleanor	S	Chance, Seedling, by Mr. Coombe, N.J.	healthy	M	9	9
37	Fremont	S	From Belmont, by G. F. Beede, N.H.	healthy	M to L	8	7
38	Gardner	S	Found wild from Iowa	healthy	M to L	7	6
39	Giant	S	Chance seedling from N. Y	healthy	M	8	8
40	Grenville	P	Chance seedling, by E. Beuchly, Ohio	very healthy	S to M	9	10
41	Glenfield	S	From Warfield x Glendale, by Dr. Stayman, Kansas	healthy	M to L	7	6
42	Gov. Hoard	S	By F. W. Loudon, Wis	healthy	M to L	8	6
43	Gertrude	S	Chance seedling, C. C. Stone, Ill	healthy	S to M	9	7
44	Gandy Belle	S	Unknown from N.J	healthy	M	8	7
45	Glen Mary	S	Chance seedling, by J. A. Ingram, Pa.	very healthy	M	9	9

STRAWBERRIES.

E. B. Stevenson, Freeman, Experimenter.

Flesh : F, Firm ; S, Soft.

Season : E, Early ; M, Medium ; L, Late.

Number.	Berry. Size.	Form.	Color.	Date of first bloom.	Date of first picking.	Flesh.	Flavor.	Season.	Value. Scale 1-10. Dessert.	Market.	Remarks.
				May	June						
1	L	RC	DR	18	11	F	good	L	8	9	A very good one.
2	M to L	L	BR	M16	.....	F	fair	M	8	7	Worth a trial.
3	M	C	DC	6	.....	F	good	E to M	6	9	A second Walfield.
4	M to S	C	LC	.....	12	F	good	E to M	9	8	A fair one.
5	M to L	R	BS	21	... ..	VF	very best.	VL	10	7	Fine flavor.
6	M to L	L	BR	17	.....	F	fine	M	8	8	Further trial.
7	M	RC	DS	16	11	F	good	E to M	7	7	Another year's trial.
8	VL	RC	BS	10	6	Med	good	M	8	10	One of the standards.
9	M to L	RC	DR	21	9	F	fine	M to L	8	9	Worth trying.
10	M	R	LR	6	5	S	only fair .	E	6	9 / 6	Near. / Distant, fair early.
11	M to S	C	R	.....	.....	M to S	good	E to M	6	8	Very like Crescent.
12	M	RCI	.....	18	13	M	medium ..	M	7	7	Another trial.
13	M to L	C	BR	20	12	F	good	M	8	9	A good one for market.
14	M to L	RC	DS	21	12	F	good	M to L	8	9	Worth trying.
15	L	L	S	18	12	F	good	L	8	7	A good one.
16	M	RC	BS	.....	9	F	good .. .	M	9	7	Fine to eat.
17	L	RC	BR	18	8	M	good.....	M	8	8	A good one.
18	M to L	RC	DR	16	13	F	very good.	M	10	7	A fine one.
19	M	C	R	28	13	F	good	M	9	7	Fair.
20	L	RC	DR	9	5	Med	fair	M	7	7	Another trial.
21	M to L	RC	DR	.....	...	F	good	M	8	8	A good one.
22	L	L	BS	18	9	F	good	M	8	9	A good one.
23	L	RC	BS	9	4	VF	good	E to M	9	10	One of best.
24	M to L	C	BS	6	6	F	good	E	8	9	A good one.
25	M	LC	DS	.. ...	14	F	good	M	8	6	Not valuable.
26	S to M	C	BS	.. ..	.....	Med	good	E to M	7	8	Too small.
27	L	C	BDS	22	18	F	good	L	9	9	Further trial.
28	VL	I	DS	12	12	F	good	M	7	5	Not yield enough.
29	L	LC	DC	16	.....	VF	fair	L	6	9	A good one.
30	M to L	RC	LC	.....	.....	F	fair	M to L	7	6	Not valuable.
31	M	RC	LR	.....	.....	M	only fair .	M	6	8	Not do well here.
32	M to L	IR	DR	18	.....	M	fair	M	7	8	Worth a trial.
33	M	C	LR	.....	10	M	medium .	M	7	8	Not valuable.
34	VL	I	BR	.....	....	F	fair	M	7	8	Very irregular.
35	M	RC	DR	18	.....	F	good	VL	8	8	A good one.
36	L	RC	C	Apl 30	M'y 29	F	good	EE	8	9	A good one.
37	M	C	BR	May	J'ne 15	F	fine	M	8	6	
38	M to L	C	LR	8	14	F	good	M to L	7	6	Another trial.
39	L	RC	S	15	12	M	good	M to L	7	8	Worth a trial.
40	L	RC	BR	14	9	M	good	M	8	10 / 6	Near. / Distant, one of best.
41	M	C	DC	16	3	F	good	M	10	8	Best quality.
42	L	RC	BR	... .	. ..	F	very good.	L	9	8	Not productive.
43	M	RC	S	18	11	M	good	M	7	6	Not valuable here.
44	L	RC	DS	18	12	F	fair	M	8	7	Does well in some places.
45	L	RC	C	.....	16	F	good	M to L	8	9	Worth a trial.

STRAWBERRIES

Number.	Variety.	Sex.	Plant. Origin.	Foliage. Healthy or liable to rust.	Fruit stalk.	Vigor. Scale 1-10.	Productiveness. Scale 1-10.
46	H. W. Beecher	S	From Champion x Sharpless, by H. H. Alley, N. J.	very healthy	M	9	6
47	Haverland	P	Mr. Haverland, from Ohio	very healthy	L	9	10
48	Howard's No. 25	S	From Haverland x Belmont, by A. B. Howard, Mass	some rust	M	8	5
49	Howard's No. 41	P	From Haverland x Belmont, by A. B. Howard, Mass	healthy	M	9	8
50	Howard's No. 501	S	From Jersey 2 x Wilson, by A. B. Howard, Mass	healthy	M to S	9	8
51	Hersey	S	By Mr. S. Hersey, Mass	h'lthy, some rust.	M to S	7	6
52	Hatch Ex. Stn. No. 24	S	By Hatch Experiment Station, Mass	h'lthy, some rust.	M to S	7	6
53	Hunt's No. 3	S	By T. R. Hunt, N.J.	very healthy	M	9	8
54	Huntsman	SP	By W. A. Huntsman, Mo	h'lthy, some rust.	M to S	8	8
55	Hiawatha	S	From Aroma, by Dr. Stayman	very healthy	M	10	7
56	Hull's No. 3	S	By E. J. Hull, Pa	healthy	M	9	8
57	Iowa Beauty	S	Unknown, C. P. Walworth, Ia.	healthy	M	7	7
58	Ivanhoe	S	From Prince of Berries, by G. W. Trowbridge, Ohio.	healthy	M	7	7
59	Irene	P	By Mr. Riehl, Ill	healthy	M	8	7
60	Jessie	S	From Sharpless, by F. W. Loudon, Wis.	very healthy	M	9	6
61	Jucunda Improved	S	From Old Jucunda, by A. Gerbert, Pa.	some rust	M to S	8	7
62	Jersey Queen	P	Unknown	very healthy	S	7	8
63	Judsonia	S	Unknown	some rust	M	7	6
64	Jarabolo	S	From Mrs. Cleveland, by Dr. Stayman, Ka	h'lthy, stools out.	M	8	7
65	Kansas Prolific	S	From Warfield, by Dr. Stayman	very healthy	S to M	9	7
66	Lord Sheffield	S	From England	h'lthy, some rust.	M	8	8
67	Leader	S	By J. B. Campbell, Mass	healthy	M to L	7	7
68	Longfield	P	From Warfield, by Dr. Stayman, Ka	very healthy	M to L	10	9
69	Leroy	P	By J. H. Haynes	healthy	M	8	8
70	Lovett's	S	From Crescent x Wilson, by J. H. Norris, Ka	h'lthy, some rust.	M to L	9	7
71	Leniathan	S	From Sharpless, by Mr. Wolfgang, Ohio	healthy	M	8	7
72	Lady Franklin	P	From Sharpless, by Mr. Wolfgang, Ohio	healthy	S to M	9	6
73	Magnate	P	From Warfield, by Dr. Stayman	healthy	L	8	6
74	Maple Bank	P	By Wm. Stevenson, Ont	h'lthy, some rust.	M	8	8
75	Michel's Early	S	Chance, through Crescent, J. G. Michel, Ark.	healthy	S to M	10	5
76	Muskingum	S	By G. Kearns, Ohio	healthy	M	8	6
77	Mary	P	From Windsor, Chief, by H. H. Alley, N. J	healthy	M to L	8	8
78	Margaret	P	From the Crawford, by J. F. Beaur, Oh.	healthy	M	9	8
79	Mrs. Cleveland	P	From Cumberland, by Geo. Townsend, Ohio	healthy	M	8	6
80	Murray	S	Supposed from Crescent	healthy	M	8	7
81	Marshal	S	Chance seedling, Mr. Ewell, Mass.	some rust	M to L	8	7
82	No Name	S	Unknown frem N. J.	healthy	M	8	7
83	Northern	S	Unknown	very healthy	S to M	8	7
84	Ohio Centennial	SP	Unknown	h'lthy, some rust.	S	6	8
85	Oberholtzer's No. 3	P	By D. Oberholtzer, Ohio	healthy	M	8	8
86	Pine Hill No. 20	P	By C. G. Bushnell, Conn	healthy	L	7	7
87	Phillips	S	From Crescent x Sharpless	some rust	S to M	9	7
88	Princess	P	By J. C. Kramer, Minn., unknown parentage	healthy	M	7	6
89	Paris King	S	By C. O. Curtis, Ill	healthy	L	8	7
90	Prince of Berries	P	Seedling, Jersey Queen	very healthy	L	8	8
91	Princeton Chief	P	Supposed Crescent x Kentucky, by F. W. Pascharsky	some rust	L	8	5

—*Continued.*

Number.	Berry. Size.	Form.	Color.	Date of first bloom.	Date of first picking.	Flesh.	Flavor.	Season.	Value. Scale 1-10. Dessert.	Market.	Remarks.
46	M	RI	DC	May 24	.....	F	good	L	6	6	Not valuable.
47	L	L	BS	6	M'y30	M	fair . ..	E to M	8	10 / 6	Near. / Distant. One of best.
							good	M	9	6	Not valuable.
48	M	RC	DR	8	June 7	F	good	M	9	8	Worth a trial.
49	L	RC	BC	14	12	M	good	M	8	8	A good one.
50	M	R	BR	.....	.....	F	good	M	7	6	Not valuable here, another trial.
51	M to S	BCD	DR	21	.. ...	F	fair	M	8	6	Only medium.
52	L	R	DR	16	14	S to M	fair	M	8	8	Worth a trial.
53	L	RC	C	19	7	F	good	M	8	7	A fair one.
54	L	R	DC	15	7	S to M	m to good.	M	8	8	Worth trying.
55	M	R	S	23	12	M	fair	M	7	7	Further trial.
56	M to L	RC	DR	20	14	M	medium ..	M	10	7	Fine quality.
57	L	RC	DS	1	12	F	very good	M to L	6	7	No good here.
58	M	C	BR	.....	12	F	good	M	7	7	Further trial.
59	M	C	DR	14	11	F	fair	E to M	9	8	Not productive enough.
60	L	RC	BR	2	6	F	best	M	9	7	Not productive enough.
61	L	C	BS	....	.....	F	very good.	VS	8	9	One of best lates.
62	L	R	BS	.....	15	M	good	M	7	7	Not much good.
63	M to L	RBC	LC	....	.....	M	fair	M to L	7	8	Further trial.
64	L	RC	BR	12	16	F	fair	M	8	8	Worth trying.
65	M	RC	BS	14	3	F	good	M	8	7	Did the best of the English kinds with me.
66	L	C	BC	8	6	F					
67	L	C	DR	8	4	F	good	E	10	7	Good one for amatures.
68	M to L	LC	DC	20	6	VF	very good.	L	8	10	One of best.
69	M	DRC	DR	.....	.....	M	good	M	8	7	Another trial.
70	M to L	RC	DR	14	4	F	good sprightly	M	7	8	Worth a trial.
71	L	BD	LS	15	12	F	medium .	M to L	8	6	Not ripen early, not as good as Sharpless.
72	L	RC	BR	16	12	F	good	M	8	6	Not productive enough.
73	M	LC	BR	16	10	F	very good.	M	8	6	Not productive enough.
74	M to L	RC	DC	14	10	VF	good	M to L	9	8	Worth trying.
75	S to M	R	LS	5	M'y29	M	good	EE	6	8	Did well this year.
76	M to L	DC	BR	.....	.....	F	good	M to L	8	7	Worth a trial.
77	L	RC	DR	14	J'ne13	F	good . ..	M	7	9	A good one.
78	L	RC	C	12	8	F	good	M	9	8	A good one.
79	L	R	BR	.....	4	M to S	good	M	8	6	Too soft for market.
80	M	RC	DR	15	.....	M	good	E to M	7	7	Further trial.
81	V L	RL	DC	21	12	F	good	M	8	7	Wants petting.
82	L	RC	DS	.....	12	F	good	M	8	7	
83	S	R	BS	.....	12	F	good	E	8	6	Not much good.
84	V L	BRC	BS	....	14	F	good	M to L	9	7	Valuable.
85	L	RC	BC	.. ..	15	F	good	M	8	7	
86	L	R	BR	18	11	F	good	M	9	6	Not valuable.
87	L	RC	DR	14	11	F	good	M to L	8	7	Worth trying.
88	M	R	S	.....	.....	F	medium ..	M	7	7	
89	M to L	LC	BR	15	8	F	good	M	8	8	A good pollenizer.
90	M to L	RC	BR	.....	....	M	good	L	7	8	Worth growing
91	M	R	DR	. ....	.....	M	good	L	7	7	Not much value.

STRAWBERRIES

Number.	Variety.	Sex.	Origin.	Plant. Foliage. Healthy or liable to rust.	Fruit stalk.	Vigor. Scale 1-10.	Productiveness. Scale 1-10.
92	Plow City	S	From Sharpless, by C. C. Stone, Ill	healthy	M to L	7	7
93	Robinson	S	From Crescent x Chas. Downing, by by J. G. Robinson, Ka	healthy	M	8	8
94	Rio	S	From Sharpless, by M. T. Thompson, Va.	healthy	S to M	9	8
95	Richmond	S	By M. T. Thompson, Va	healthy	M	7	6
96	Ruby	S	By M. Riehl, Ill	very healthy	M	9	9
97	Roser	S	By E. L. Roser, Ohio	healthy	M	9	8
98	Staples	S	From Warfield, by Mr. Staples, Ohio	healthy	M	8	9
99	Smith	S	By L. Smith, Wis	healthy	S to M	10	8
100	Saunders	S	By J. Little, Ont	h'lthy, some rust.	M	9	9
101	Sunnyside	P	By C. S. Pratt, Mass	healthy	M	8	8
102	Snowball	S	By E. Cone, Wis	rusts some	M to L	9	5
103	Splendid	S	By C. H. Summer, Ill	very healthy	M	10	6
104	Stone's Early	P	From Crescent x Piper, by C. C. Stone, Ill	healthy	M to L	7	8
105	Springdale	S	From Aroma, by Dr. Stayman	very healthy	M to L	8	7
106	Shawnee	S	From Cyclone, by Dr. Stayman	healthy	L	8	8
107	Sunrise	P	From Crescent x Sharpless, by J. Harrison, Mass	healthy	M	7	7
108	Shapless Improved	S	From Sharpless, by J. Hule, Conn	healthy	M	8	6
109	Tennessee Prolific	S	From Crescent x Sharpless, by J. C. Hodges, E. Tenn	very healthy	M	9	9
110	Thompson's No. 40	P	From mixed seed, by M. T. Thompson, Va	some rust	M	9	8
111	Timbrell	P	Chance, by H. S. Timbrell, N. Y	very healthy	M	8	6
112	Vera	P	Chance, by E. B. Stevenson	very healthy	M to S	10	9
113	Van Deman	S	From Crescent x Capt. Jack, by J. C. Bauer, Ark	h'lthy, some rust.	M	8	8
114	Victor Hugo	S	Unknown	healthy	M	8	8
115	Warfield	P	Supposed Crescent x Wilson, by B. C. Warfield, Ill	very healthy	M to L	10	9
116	Wm. Belt	S	By Wm. Belt, Ohio	some rust	M	8	9
117	Williams	S	From Sharpless, by Mr. Williams, Ont.	some rust	M	9	8
118	Woolverton	S	By J. Little, Ont	healthy	M to L	8	8
119	Weston	P	By E. A. Weston, Pa.	healthy	M	8	8
120	Westlawn	P	From Longfellow, by C. P. Bauer, Ark.	very healthy	M	9	7
121	Timbrell, No. 15	S	From Timbrell x Marshall & Brandy wine, by E. B. Stevenson	healthy	M to L	8	....
122	" 16	P	" "	healthy	M	9	....
123	" 10	P	" "	very healthy	L	8	....
124	" 18	P	" "	healthy	M	8	....
125	" 22	P	" "	healthy	M	9	....
126	Howard, No. 25	S	From Howard's No. 41 x Marshall & Brandy wine, by E. B. Stevenson.	very healthy	M	9	....
127	" 22	P	" "	healthy	M	9	....
128	Marshall, No. 40	S	From Marshall, by E. B. Stevenson	very healthy	M to L	8	....
129	" 41	S	" "	healthy	M	8	....
130	" 42	S	" "	healthy	M	8	....
131	" 43	S	" "	healthy	M to L	9	....
132	" 46	S	" "	healthy	M	8	....
133	" 49	S	" "	healthy	M	8	....
134	Own, No. 2	S	From mixed seed, by E. B. Stevenson	very healthy	M to S	9	....
135	" 10	P	" "	healthy	M	9	....
136	" 65	S	" "	very healthy	M	8	....

—*Concluded.*

Number.	Berry. Size.	Form.	Color.	Date of first bloom.	Date of first picking.	Flesh.	Flavor. (See Thomas.)	Season.	Value. Scale 1-10. Dessert.	Market.	Remarks.
				May	June						
92	M to L	C	C	14	12	F	medium ..	L	7	7	Another trial.
93	M	C	DR	10	12	F	good	M	6	8	
94	M	C	BR	9	5	F	medium ..	E	8	8	A good one.
95	M	R	DS	.....	.....	F	good	M	6	7	Not very valuable.
96	V L	RC	BC	13	12	F	good	M	8	9	Well worth a trial by all.
97	M to L	R	BR	.....	6	M	good	E	7	8	Worth a trial.
98	M	RC	DC	5	1	F	fair	E	8	9	A good one.
99	M to L	R	LS	8	6	M	good	E	8	9	A good early.
100	L	RC	BC	21	14	F	good	M to L	9	9	One of best.
101	M	C	LS	.....	3	F	very good.	E to M	7	8	Good market.
102	M	C	DR	.....	5	F	medium ..	E to M	7	7	Not valuable.
103	M	R	BR	16	11	F	good	M	6	6	Another trial.
104	S	C	S	6	5	M	medium ..	E	8	6	Not valuable.
105	M to L	R	BS	.....	.....	M	fair	M	7	7	Another trial.
106	M to L	C	BR	.....	.....	M	fair	M	7	7	Further trial.
107	M	RC	BC	.....	9	M	good	M	8	7	Another trial.
108	M	RC	BS	10	8	F	fair	M	8	6	Not as good as Sharpless.
109	M to L	RC	BS	12	9	F	medium .	M	7	9	A good one.
110	M	BC	S	18	10	M	good	M	6	8	Worth a trial.
111	M to L	RC	BR	11	10	VF	fair	L	10	8	A good one.
112	M to L	RC	BR	14	5	F	best	M to L	9	9	A good one.
113	M to L	RC	BC	5	M'y30	VF	good	E	10	9	One of best earlies.
114	M	C	BR	18	....	M	best.....	E to M	8	8	Worth a trial.
115	M	C	DC	6	June1	F	fair	E to M	8	9	One of best.
116	V L	RC	BR	12	12	F	good	M to L	10	9	Worth a trial.
117	L	RC	DR	24	14	F	b quality.	M	6	8	Not as good as Saunders.
118	V L	BC	DR	8	9	F	medium .	L	9	8	A good one for late.
119	M to L	BC	BR	20	10	F	good	L	9	8	A good one.
120	M to L	LC	DS	14	12	F	good	L	8	7	Further trial.
121	L	RC	C	13	13	VF	fair	M to L	....	....	
122	V L	R	C	13	13	F	fine ...	M to L	....	....	
123	L	RC	DR	10	8	VF	good acid.	M	...	....	
124	V L	R	C	13	13	F	very good	M to L	....	....	
125	L	BC	C	17	18	F	good	VL	....	...	Good bunch of fruit.
126	L	LC	C	14	13	F	good	L	....	....	
127	L	RC	C	13	13	F	very good.	L	....	....	Beautiful green calyx.
128	V L	R	BR	8	9	VF	best.....	M	....	....	Very large foliage, a fine one.
129	M to L	C	BC	8	6	F	fine flavor.	M	....	....	Perfectly white inside.
130	L	RC	BC	7	6	VF	best.... .	E to M	. ..	...	A beautiful berry.
131	L	BC	C	12	8	F	good	M	....	....	A good one.
132	M	BC	DR	13	11	F	good	L to M	....	.	
133	L	R	BR	12	11	F	fine	M	....	....	
134	L	R	BR	7	8	F	good	M	....	....	A fine berry.
135	L	RC	BS	7	8	F	acid.....	M	....	....	
136	L	OB	C	18	18	F	fine . ..	VL	....	....	A good one.

CATALOGUE OF FRUITS FOR THE USE OF PLANTERS.

Values for apples given by Station 9, except where otherwise noted by station numbered in brackets.

Varieties tested.	Season of use.	Tree.			Total value of tree.	Fruit.				Total value of fruit.	Adaptation to Province.								
						Quality, Scale 1-10.		Value, Scale 1-10.			Southern. Stations 1, 2, 3, 4 and 13.			Middle. Stations 5, 6, 8 and 9.			Northern. Stations 7 and 10.		
		Vigor, Scale 1-10.	Hardiness, Scale 1-10.	Productiveness, Scale 1-10.		Dessert.	Cooking.	Home market.	Foreign market.		Vigor.	Hardiness.	Productiveness.	Vigor.	Hardiness.	Productiveness.	Vigor.	Hardiness.	Productiveness.
APPLES.																			
Albury	Aug.-Sept	8	10	6	24	6	6	4	.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alexander	Aug.-Oct	10	10	8	28	4	9	9	9	31	.....	.....	.....	.....	.....	.....	8	10	6 (10)
American Golden Russet	Jan.-May	8	10	6	24	8	8	7	9	32	.....	.....	.....	.....	.....	.....	8	9	8 (7)
Bailey Sweet	Nov.-Mar	6	8	8	22	4	8	4	4	20	.....	.....	.....	.....	.....	.....	.....	.....	.....
Baldwin	Jan.-Mar	6	7	8	21	4	6	8	8	26	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beauty of Kent	Oct.-Nov	10	10	8	28	4	6	8	8	26	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ben Davis	Mar.-May	8	10	10	28	4	6	6	9	25	.....	.....	.....	.....	.....	.....	8	9	10 (7)
Benoni	July-Sept	8	10	8	26	10	8	4	7	29	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blenheim Pippin	Nov.-Mar	10	10	10	30	6	7	9	9	31	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blue Pearmain (8)	Oct.-Feb	8	8	7	23	8	7	8	9	32	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bogdanoff (7)	Oct.-April	10	10	8	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bonum	Dec.-Feb	8	10	10	28	8	8	7	7	30	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston Star (8)	Oct.-Dec	9	10	10	29	6	9	7	8	30	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brockville Beauty (10)	Aug.-Sept	7	8	10	25	9	9	7	.....	25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cabashea	Dec.-Feb	10	10	5	25	2	6	6	6	20	.....	.....	.....	.....	.....	.....	.....	.....	.....
Canada Red	Dec.-Mar	8	9	10	27	6	8	8	.....	22	.....	.....	.....	.....	.....	.....	9	9	7 (10)
Chenango Strawberry (8)	Sept.-Oct	6	7	7	20	9	7	7	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colvert (7)	Oct.-Jan	9	10	9	28	5	9	9	8	31	.....	.....	.....	.....	.....	.....	.....	.....	.....
Duchess	Aug.-Sept.	10	10	10	30	6	9	10	9	34	.....	.....	.....	.....	.....	.....	9	10	10
Early Harvest (8)	July	6	7	8	21	9	8	6	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fallawater	Jan.-Mar	10	10	5	25	6	8	8	9	31	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fall Pippin	Oct.-Dec	10	10	8	28	6	10	6	6	28	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fall Queen (Haas)	Sept.-Nov	8	8	8	24	5	6	6	6	23	.....	.....	.....	.....	.....	.....	10	10	10 (7)
Fameuse	Sept.-Dec	8	8	10	26	10	8	10	8	36	.....	.....	.....	.....	.....	.....	8	8	10
Gideon (7)	Oct.-Dec	10	10	10	30	8	9	10	8	35	.....	.....	.....	.....	.....	.....	10	10	10 (7)
Golden Sweet	Aug.-Sept	10	10	10	30	2	4	1	.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....
Golden White	Aug.-Sept	10	10	10	30	6	8	8	.....	22	.....	.....	.....	.....	.....	.....	.....	.....	.....

Grand Sultan	Aug.-Sept.	10	10	8	28	5	8	6	6	25									
Gravenstein	Aug.-Oct	10	10	10	30	10	10	10	10	40									
Grimes' Golden	Oct.-Mar.	7	5	8	20	9	4	6	7	26							7	5	8 (7)
Hare Pipka (7)	Sept.-Oct	10	10	9	29	5	8	8	7	28									
Hastings	Jan.-Feb	8	9	8	25	8	7	7	6	28									
Hawthornden (new)	Oct.-Dec	8	8	8	24	7	7	8	8	30									
Hawthornden (old)	Sept.-Nov.	7	8	8	23	5	7	5	7	24									
Highland Beauty	Jan.-Mar	6	9	8	23	9	7	7	7	30									
Holland Pippin (8)	Aug.-Oct	8	8	7	23	6	7	6	5	24									
Horn	Dec.-Mar.	8	10	10	28	8	7	7	7	29									
Hubbardston's Nonsuch	Dec.-Mar	8	10	9	27	6	7	8	8	29									
Hurlbut	Dec.-Feb	7	9	7	23	8	8	8	8	32							8	9	8 (7)
Jonathan	Dec.-Mar	8	8	9	25	10	7	8	9	34									
Kean's Seedling (7)	Sept.-Nov.	10	10	10	30	7	10	9	7	33									
Kentish Filbasket (8)	Oct.-Jan	9	9	8	26	4	9	7		20									
King of Tompkin's Co (7)	Oct.-Mar.	7	5	5	17	9	9	10	10	38							7	5	8 (7)
Lady	Jan.-Mar	7	8	9	24	9		1	2	12									
La Rue (Baxter)	Oct.-Dec	10	8	6	24		7	7	6	20							8	10	5 (7)
Lord Burleigh	Jan.-May	10	9	9	28	8	10	8	8	34									
Lord Suffield	Aug.-Sept	6	8	9	23	4	7	5	5	21									
Lowell Pippin (5)	September	6	8	9	23	6	7	9		22									
McIntosh Red	Nov.-Mar	9	10	10	29	10	8	8	7	32									
Maiden's Blush (7)	Oct.-Dec	9	10	10	29	5	8	9	8	30							9	10	10 (7)
Mann	Feb.-May	7	10	5	22	6	8	6	7	27							7	7	8 (7)
Margil	Nov.-Jan	6	7	9	22	10	8	7	7	32									
Minkler	Jan.-April	9	10	8	27	6	7	8	8	29									
Mother	Nov.-Jan	5	7	7	19	10	8	7	7	32									
Mountain Beet	Sept.-Oct	8	9	8	25	6	6	5		17									
Mountain Tulip	Sept.-Oct	7	8	8	23	6	6	6		18									
Munson Sweet	Oct. Dec	10	10	10	30	1	3	2		6									
Northern Spy	Jan.-Mar	10	8	10	28	9	9	9	9	36							9	7	9 (7)
Northfield Beauty	September	8	9	9	26	9	8	9		26									
Ontario	Jan.-Mar	8	9	10	27	9	9	9	9	36									
Pewaukee	Jan.-Mar	10	10	8	28	7	8	8	8	31							10	10	8
Princess Louise (8)	Dec.-Feb	6	7	9	22	8	6	8	9										
Plumb's Cider	Oct.-Dec	8	9	10	27	4	4	4		12									
Rambo	Oct.-Jan	9	10	10	29	5	5	5		15									
Rawle's Janet	Feb.-June	6	9	10	25	5	4	5	5	19									
Red Astracan (7)	Aug.-Sept.	9	10	8	27	8	8	7	1	24									
Rhode Island Greening	Jan.-Mar	8	8	10	26	8	10	8	8	34							7	5	10
Ribston Pippin	Nov.-Mar	7	7	6	20	10	8	9	10	37									
Roxbury Russet	Jan.-May	7	7	8	22	6	7	8	8	29									
Salome (8)	Jan.-May	8	9	7	24	9	6	8	10	33									
Scarlet Pippin	Sept.-Dec	9	10	10	29	10	9	10		29									
Seek-no-Farther	Oct.-Mar.	9	8	8	25	7	7	9	9	32									
Sops of Wine	Aug.-Sept.	8	9	7	24	4	4	4		12									
Sour Bough (5)	Aug.-Sept.	10	9	8	27	2	7	8		17									
St. Lawrence (7)	Oct.-Nov	10	10	10	30	10	9	9	5	33									
Stuart's Golden	Dec.-Mar	8	9	10	27	7	6	6	6	25									
Swaar (8)	Dec.-Mar	8	8	7	23	8	7	8	9	32									
Swayzie Pomme Grise	Nov.-Jan	7	8	9	24	9	8	5		22									

CATALOGUE OF FRUITS FOR THE USE OF PLANTERS—*Continued.*

Varieties tested.	Season of use.	Tree.				Fruit.					Adaptation to Province.								
						Quality. Scale 1-10.		Value. Scale 1-10			Southern Stations 1, 2, 3 and 4			Middle. Stations 5, 6, 8 and 9.			Northern. Stations 7 and 10.		
		Vigor, Scale 1-10.	Hardiness, Scale 1-10.	Productiveness, Scale 1-10	Total value of tree.	Dessert.	Cooking.	Home market.	Foreign market.	Total value of fruit.	Vigor.	Hardiness.	Productiveness.	Vigor.	Hardiness.	Productiveness.	Vigor.	Hardiness.	Productiveness.
APPLES.—*Continued.*																			
Sweet Bough (5)	Aug.-Sept	7	9	8	24	8	.....	5	.....	13	.....	.....	.....	.....	.....	.....	.....	.....	.....
Talman Sweet (7)	Oct.-Mar	10	10	9	29	6	5	2	5	18	.....	.....	.....	.....	.....	.....	9	10	9 (10)
Tetofsky (7)	August	9	10	9	28	7	9	6	.....	22	.....	.....	.....	.....	.....	.....	.....	.....	.....
Twenty Ounce (7)	Oct.-Jan	9	9	8	26	4	7	8	9	28	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wealthy (7)	Sept.-Dec	9	9	10	28	8	8	9	8	33	.....	.....	.....	.....	.....	.....	8	9	10 (10)
Wagener (7)	Oct.-Mar	8	9	8	25	7	8	8	7	30	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Bellflower (10)	Dec.-Mar	6	8	5	19	9	8	7	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Transparent (7)	August	10	10	8	28	6	8	6	.....	20	.....	.....	.....	.....	.....	.....	.....	.....	.....
PEARS.																			
Annanas d'Ete	Aug.-Sept	8	6	4	18	4	4	5	.....	13	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bartlett	September	8	6	9	23	9	9	10	.....	28	8	7	10	.....	.....	.....	.....	.....	.....
Belle Lucrative	Sept.-Oct	8	8	8	24	8	8	8	.....	24	7	9	7	.....	.....	.....	.....	.....	.....
Beurre Clairgeau	Nov.-Dec	8	6	8	22	4	6	8	.....	18	.....	.....	.....	.....	.....	.....	8	5	7
Beurre d'Anjou	Nov.-Jan	10	10	6	26	8	8	10	.....	26	10	10	7	.....	.....	.....	.....	.....	.....
Beurre Antoine	September	7	7	7	21	8	4	6	7	25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beurre Gris d'Hiver	March	10	10	8	28	4	4	4	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beurre Hardy	Sept.-Oct	10	10	10	30	8	8	9	.....	25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beurre Superfine	October	7	8	8	23	8	4	6	8	24	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brockworth Park	Oct.-Jan	8	8	7	23	7	6	6	9	28	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffum	October	10	10	10	30	4	4	4	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clapp's Favorite	Aug.-Sept	10	8	10	28	8	8	9	.....	25	10	9	8	.....	.....	.....	.....	.....	.....
Doyenne Boussock	Sept.-Oct	10	10	10	30	8	9	9	.....	26	.....	.....	.....	.....	.....	.....	.....	.....	.....
Doyenne d'été	July.-Aug	8	7	8	23	8	.....	8	.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....
Duchess d'Angoulême	October	8	8	7	23	8	8	8	9	33	9	9	9	.....	.....	.....	.....	.....	.....
Flemish Beauty	September	9	9	8	26	8	9	7	7	31	10	10	9	.....	.....	.....	9	9	8
General Todleben	Nov.-Dec	8	9	8	25	10	8	8	.....	26	.....	.....	.....	.....	.....	.....	.....	.....	.....

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CATALOGUE OF FRUITS.—*Continued.*

PLUMS.

Values given at Station Number 6.

Variety	Season of use.	Tree.				Quality.		Value.		
		Vigor, Scale 1-10.	Hardiness, Scale 1-10.	Productiveness, Scale 1-10.	Total value of tree.	Dessert, Scale 1-10.	Cooking, Scale 1-10	Home market, Scale 1-10.	Foreign market, Scale 1-10	Total value of fruit
Bradshaw	Aug. Sept.	7	8	9	24	8	9	10	....	27
Coe's Golden Drop	Sept.-Oct	4	8	8	20	7	10	10	...	27
Columbia	September	10	8	10	28	8	9	10	....	27
Duane's Purple	August	9	8	5	22	7	7	7	....	21
Early Black Damson	August	9	10	10	29	..	7	4	....	11
General Hand	September	10	9	6	25	7	8	10	....	25
German Prune	Sept.-Oct	6	7	7	20	....	9	8	....	17
Glass Seedling	September	10	10	9	29	4	8	7	..	19
Goliath	August	8	7	8	23	6	7	7	....	20
Gueii	August	10	10	8	28	5	7	7	....	19
Howard's Favorite	Sept.-Oct	8	10	8	26	6	9	9	....	24
Imperial Gage	August	10	8	9	27	10	10	10	....	30
Ireland's Golden Gage	August	10	8	8	26	8	9	10	....	27
Jefferson	Early September	7	6	6	21	10	10	10	....	30
Lawrence's Favorite	August	10	8	8	26	10	10	7	....	27
Lombard	September	10	10	10	30	8	9	8	....	25
McLaughlin	August	8	7	6	21	10	10	9	....	29
Moore's Arctic	Early August	7	10	10	27	2	5	7	....	14
Orange	August	9	8	8	25	4	6	8	....	18
Peach	August	7	6	4	17	8	8	8	....	23
Pond's Seedling	Sept.-Oct	10	10	8	28	4	7	7	....	18
Prince of Wales	September	6	7	6	19	8	9	10	....	27
Prince's Yellow Gage	Early August	9	10	8	27	6	6	7	....	19
Quackenbos	September	10	10	9	29	4	8	7	....	19
Reine Claude de Bavay	.....	8	7	8	23	10	10	10	....	30
Smith's Orleans	Aug.-Sept	10	10	9	29	6	9	9	....	24
St. Catherine	September	8	8	8	24	10	10	9	....	29
Washington	Aug.-Sept	9	7	8	24	10	10	10	....	30
Yellow Egg	September	8	8	6	22	....	8	10	....	18
Yellow Gage	August	6	7	8	21	7	10	7	....	24

CATALOGUE OF FRUITS.—*Continued.*

CHERRIES

Values given by Station 13, except where otherwise specified.

Variety.	Season.	Tree.				Quality.		Value.			Adoption to province.								
											Southern.			Middle.			Northern.		
											Stations 1, 2, 3, 4 and 13.			Stations 5, 6, 8 and 9.			Stations 7 and 10		
		Vigor, Scale 1-10.	Hardiness, Scale 1-10.	Productiveness, Scale 1-10.	Total value of tree.	Dessert, Scale 1-10.	Cooking, Scale 1-10.	Home market, Scale 1-10.	Distant market, Scale 1-10.	Total value of fruit.	Vigor.	Hardiness.	Productiveness.	Vigor.	Hardiness.	Productiveness.	Vigor.	Hardiness.	Productiveness.
I. PRUNUS CERASUS (sour cherry class).																			
(a) *Kentish*																			
Early Richmond	June 20-26	4	10	6	20	3	9	7	7	26	4	10	6	4	10	6			
Late Kentish	July 1-10	4	10	4	18	2	7	6	6	21							3	8	6
Montmorency, large	July 1 10	6	10	8	24	3	9	7	7	26									
(b) *Morellos*																			
Ostheim	July 8-15	4	10	7	21	4	8	7	7	26	4	10	7	4	10	7	3	10	6
Vladimir	July 6-10	3	10	3	16		3	2	2	7									
Wragg	July 8-16	5	10	8															
II. PRUNUS AVIUM (sweet cherry class)																			
(a) *Mazzards.*																			
Black Mazzard	July 1-10	10	10	4	24		2	2		4									
(b) *Hearts.*																			
Black Eagle	June 20 30	6	10	4	20	10	4	7	4	25	6	10	4	6	4	4			
Black Tartarian																			
Coe's Transparent	June 15-20	10	10	5	25	7	6	6	2	21									
Early Purple	June 10-15	8	10	8	26	8	2	8	8	26	8	10	8	7	9	5			
Governor Wood	June 15-20	8	10	9	27	8	7	7	4	26									
(c) *Bigarreaus.*																			
Monstreuse de Mezel	June 25-30	10	10	9	29	8	7	10	10	35									
Napoleon Bigarreau	July 1-6	9	10	10	29	7	8	9	9	33									
Yellow Spanish	June 25-30	10	10	6	26	8	8	8	8	32									
(d) *Dukes.*																			
May Duke	June 12-20	9	10	6	25	7	10	9	8	34									

CATALOGUE OF FRUITS.—*Continued.*

GRAPES.

Values assigned at Station No. 3.

Variety.	Season of use.	Vine.				Total value of vine.	Value.		Total value of fruit.
		Vigor, Scale 1-10.	Hardiness, Scale 1-10.	Productiveness, Scale 1-10.	Freedom from disease, Scale 1-10.		Dessert, Scale 1-10.	Market, Scale 1-10.	
Adirondac	Sept.	3	2	2	2	9	9	2	11
Alvey (Hagar)	Oct.	7	8	6	8	29	2	2	4
Agawam (Rog. 15)	Oct. Nov.	9	9	8	4	30	9	9	18
Amber	Oct.	6	6	3	4	19	2	2	4
Amber Queen	Oct. Nov.	7	6	5	6	24	6	5	11
August Giant	Sept	8	8	7	8	31	5	5	10
Barry (Rog. (43)	Oct.	9	9	8	7	33	7	7	14
Black Pearl	Sept	9	9	9	9	36	2	2	4
Brighton	Sept	8	10	7	6	31	8	7	15
Catawba	Oct. Nov.	8	10	8	5	31	10	10	20
Concord	Sept. Oct.	10	10	10	9	39	6	10	16
Cottage	Sept	6	8	3	8	25	4	4	8
Creveling	Sept	10	10	6	6	32	6	4	10
Delaware	Sept	5	8	8	6	27	10	10	20
Diana	Oct.	9	9	7	6	31	6	6	12
Dracut Amber	Sept	6	9	7	6	28	2	4	6
Duchess	Oct.	6	5	6	8	25	5	6	11
Eldorado	Sept	8	8	6	7	29	9	6	15
Empire State	Sept	7	8	4	7	26	4	4	8
Eumelan	Sept	6	7	6	7	26	7	5	12
Goethe (Rog. No. 1)	Oct.	9	9	8	8	34	4	7	11
Jefferson	Oct. Nov.	4	5	5	7	21	6	6	12
Lady	Sept	2	10	2	6	20	8	8	16
Lady Washington	Oct.	9	9	7	5	30	4	4	8
Lindley (Rog. 9)	Sept.	9	10	8	8	35	9	9	18
Marion	Oct.	9	9	7	7	32	2	2	4
Martha	Sept	4	6	4	6	20	7	4	11
Massasoit (Rog. 3)	Sept	10	9	6	6	31	8	7	15
Missouri Riesling	Oct.	7	8	7	5	27	4	3	7
Moore's Diamond	Sept	6	8	6	7	27	7	7	14
Moore's Early	Sept	5	9	4	9	27	7	8	15
Noah	Oct	9	9	10	5	33	2	3	5
Perkins	Sept	8	8	7	7	30	3	5	8
Pocklington	Oct	5	8	6	8	27	7	6	13
Prentiss	Oct	6	7	6	6	25	5	5	10
Rebecca	Sept	3	4	3	3	13	8	5	13
Requa (Rog. 28)	Sept	10	8	8	7	33	8	8	16
Salem	Sept	10	8	8	6	32	8	9	17
Taylor	Oct	9	9	3	7	28	2	2	4
Vergennes	Oct. Nov.	7	7	6	7	27	6	8	14
Wilder	Sept	7	9	7	7	30	7	8	15
Worden	Sept	7	10	7	8	32	9	8	17
Wyoming Red	Sept	8	8	7	8	31	4	6	10

CATALOGUE OF FRUITS.—*Concluded.*

BLACKBERRIES.

Values assigned at Station No. 4.

Variety.	Season.	Plant.				Total value of plant.	Fruit.		Total value of fruit.
		Vigor, Scale 1-10.	Hardiness, Scale 1-10.	Productiveness, Scale 1-10	Freedom from disease, Scale 1-10.		Dessert, Scale 1-10.	Market, Scale 1-10.	
Agawam	Medium	8	10	7	9	34	5	6	11
Early Cluster	Late	8	10	3	9	30	5	5	10
Early Harvest	Late	8	6	4	9	27	1	8	4
Erie	Medium	7	10	8	9	34	7	8	15
Gainor	Early	8	10	8	9	35	9	9	18
Kittatinny	Late	8	9	10	9	36	10	10	20
Lovett's Best	Medium	9	10	5	9	33	5	4	9
Maxwell	Medium	5	10	8	9	32	5	8	13
Ohmer	Medium	8	10	8	10	36	8	8	16
Snider	Medium	9	10	9	10	38	8	8	16
Stone's Hardy	Medium	8	9	8	9	34	8	8	16
Taylor	Medium	7	10	9	9	35	9	7	16
Wachusetts	Medium	8	10	8	9	35	9	7	16
Western Triumph	Medium	10	10	9	10	39	9	9	18

RASPBERRIES.

Values assigned at Station No. 4.

All-Summer	July Oct	6	10	8	9	33	8	8	16
Columbian	Medium	10	10	10	10	40	7	8	15
Cuthert	Medium late	9	9	9	8	35	10	10	20
Golden Queen	Medium	8	7	8	9	32	9	9	18
Gregg	Late	7	8	8	4	27	5	8	13
Hilborn	Early	9	10	10	10	39	9	8	17
Kansas	Early	10	10	10	10	40	10	10	20
Lovett	Medium	8	10	8	9	35	6	8	14
Marlboro'	Early	8	10	8	10	36	7	10	17
Older	Early	9	9	7	10	35	4	9	13
Palmer	Early	9	10	7	9	35	9	8	17
Progress	Early	8	10	5	9	32	8	8	16
Thompson	Medium	7	10	7	10	34	2	7	9
Shaffer's Colossal	Medium	10	10	10	10	40	5	8	13

APPENDIX.

REPORT OF THE SUPERINTENDENT OF EXPERIMENTAL SPRAYING.

To the Honorable the Minister of Agriculture for Ontario :

SIR,—The report of the experimental spraying in Ontario in 1896, which I now have the honor of laying before you, has been carefully prepared from notes made by the several experimenters as the work was being done, and from information gathered and observations made, at my inspection of the orchards in September and October.

The past season has given the most abundant and the best crop of apples that Ontario has ever produced. Insects attacking the fruit, and fungus, have been remarkably scarce this year, the former owing probably to the severe frost of June, 1895, which destroyed the apple crop and so interfered with the propagation of these insects, and the latter owing to the seasons being unusually dry.

In many sections where heretofore the crop has been almost totally ruined by codling moth and scab, they have this year been comparatively free from them.

However at St. Catharines and Waterloo where the scab was bad, excellent results were obtained.

I do not consider that in either of those orchards, or in any in fact, the maximum results were obtained. The work was entered upon much too late in the spring as at many points the leaves were from one-half to three fourths grown, and the fruit buds were advanced far enough to show color ; which made it impossible to reach all the branches and twigs with the mixture as should be done to kill the spores of the scab. In fact the first application was made at the time the second should have been made.

Another cause which lessens the results is that the work must be done on the day set, even if the wind be high or there is an appearance of rain. Many applications were wholly or partially lost in this way.

Again, experiments are made in orchards which have never been sprayed before, or if they have been sprayed the work has only been indifferently done.

It would be interesting and instructive to have work conducted at a few points for several consecutive years and to note the results.

Insects attacking the buds and foliage, such as bud worm, tent caterpillar, canker worm, etc., have been plentiful and found at almost every point visited. These, of course, have been easily controlled and the result has been decidedly larger and better fruit on trees on which the foliage was preserved from their attacks.

When tent caterpillars and canker worms are allowed to defoliate a fruit tree, the tax on the tree of reproducing its foliage is so great that the crop will be lost and the tree so injured that it will bear little, if any, fruit the following year. I know of one case of a fine orchard, which was totally destroyed, the trees dying, from being defoliated year after year by these pests.

It is unjust that painstaking, enterprising fruit growers, should be left at the mercy of careless and lazy neighbors in this matter. The presence of these insects in an orchard is easy to detect, and their destruction is also easy and inexpensive, so that it would be no hardship to anyone and a great boon to many were the Government to enforce their destruction under a penalty.

Experiments were conducted at twenty-nine points, covering the Province from London to Winchester. This territory was divided into three districts, Mr. A. W. Muir taking the western division, Mr. C. F. Mabey, the central, and Mr. W. F. Randall, the eastern. They started on their trips on April 27th, 25th and 27th, respectively, and covered their districts about every twelve days during the season until each orchard had been visited six times. I visited each of the agents at several sprayings during the season and found them doing the work in a satisfactory manner.

Great interest was shown in the work, and although the results were not what they would have been under more favorable circumstances, still the educational value of the work was very great, more than 1,900 people witnessing the preparation and application of the mixtures.

In a number of cases people drove twenty and twenty-five miles to see work performed, and many requested to that experiments be conducted in their locality.

Spraying outfits were furnished by the Spramotor Co., of London, Ont., and The Aylmer Iron Works Co., of Aylmer, Ont., and gave entire satisfaction.

Canadian pump manufacturers are now turning out spraying pumps equal to the best made in any part of America.

I have the honor to be, Sir,

Your obedient servant,

W. M. ORR.

ST. CATHARINES, LINCOLN CO.—MR. A. PAY'S ORCHARD.

1st application, April 25th.—Fine and warm. Buds well advanced. Leaves half grown. Used Bordeaux and Paris green, bud moth quite plentiful.

2nd application, May 6th.—Fine and warm. Blossoms just opening. Used Bordeaux. Could not find any bud moth, but could see plainly where they have been working.

3rd application, May 19th.—Fine but windy. Used Bordeaux and Paris green. Found a few tent caterpillars and canker worms. About 50 per cent. of blossoms have set.

4th application, May 30th.—Fine. Used Bordeaux and Paris green. Found a few canker worms. Trees and foliage are in fine condition. There will be a full crop here.

5th application, June 10th.—Fine and warm. Used Bordeaux and Paris green. Found some bark louse.

6th application, June 25th.—Fine and warm. Rain in the evening. Used Bordeaux and Paris green.

The following varieties were experimented upon: King, Greening, Russett, Baldwin and Spy. This orchard is fairly well pruned. About half is cultivated, the remainder is in sod, but will be plowed this year.

I inspected this orchard September 23rd.

Mr. Pay has two orchards side by side. One was sprayed and one was not. The balance of the orchard in which experiments were conducted was sprayed three times. Neither of the orchards had ever been sprayed before, and Mr. Pay says that in former years more than half of the crop had been wormy or spotted.

The following results were obtained:

In Fall Pippins, which had been sprayed, five barrels of bright clean fruit, free from worms, and less than half a bushel of culls, rejected for size, were taken from one tree.

In Fall Pippins which had not been sprayed, from one tree three barrels of fruit were packed. These were not so bright or free from spot as the No. 1 sprayed, and two barrels were culled for worm and spot.

In Greenings, which had been sprayed, five men packed 125 barrels in a day, and there were less than five barrels of culls. These culls were not spotted or wormy, but undersize. This lot of fruit sold in Glasgow on October 9th at eleven shillings per barrel, the consignee writing that they were very fine.

In Greenings, which had not been sprayed, the same gang did not pack more than half as many barrels in a day, although they handled as many apples, so many having to be rejected as imperfect.

In Snow apples the result was very marked. Three trees which were sprayed three times gave eighteen barrels of beautiful fruit free from worm or spot.

Mr. Pay says that these trees have borne crops for seven or eight years, but that they have never been fit to pack before. He also considers that the foliage on the sprayed trees appears more healthy than that on the unsprayed trees.

STONEY CREEK, WENTWORTH CO.—MR. ROBT. GRANGER'S ORCHARD.

1st application, April 27th.—Rain about two hours after spraying. Buds advanced. Leaf about a quarter grown. Used Bordeaux mixture. Orchard was pruned this year.

2nd application, May 7th.—Fine and warm. Used Bordeaux and Paris green. Trees are showing a moderate bloom, which is just opening.

3rd application, May 20th.—Cloudy. Used Bordeaux and Paris green. Canker worm very bad. From thirty per cent. to forty per cent. of blossoms have set.

4th application, June 1st.—Fine and warm. Used Bordeaux and Paris green. There will be a full crop here.

5th application, June 11th.—Fine but windy. Used Bordeaux and Paris green. Bark louse plentiful. Foliage on sprayed trees looks well.

6th application, June 26th.—Fine and warm. Used Bordeaux and Paris green. There is a noticeable difference in sprayed and unsprayed foliage.

I inspected Mr. Granger's orchard and found sprayed trees of all kinds showing better fruit and foliage than unsprayed trees. In the Spy, sprayed trees will yield more than double the quantity that unsprayed trees will, and the fruit is larger and cleaner.

BURLINGTON, HALTON CO.—CAPT. D. HENDERSON'S ORCHARD

1st application, April 28th.—Fine and warm. Buds well advanced. Leaf one-quarter grown. Used Bordeaux and Paris green. Some bud moth.

2nd Application, May 8th.—Fine but windy. Buds just opening. Used Bordeaux and Paris green. Bud moth and tent caterpillar quite numerous.

3rd application, May 21st.—Fine and warm. Used Bordeaux and Paris green. Canker worm and leaf crumpler plentiful. A moderate crop of fruit has set.

4th application, June 2nd.—Fine and warm. Used Bordeaux and Paris green.

5th application, June 12th.—Fine and warm. Used Bordeaux and Paris green. Bark louse quite plentiful.

6th application, June 27th.—Fine and warm. Used Bordeaux and Paris green.

I inspected this orchard September 25th. It is well pruned and cultivated. Very little scab in this orchard. Fruit on sprayed trees was free from worms, while fruit on unsprayed trees was wormy and dropping.

ST. GEORGE, BRANT CO.—MR. JOS. VAN ATTER'S ORCHARD.

1st application, April 29th.—Fine and very windy. Buds advanced. Leaf one quarter grown. Used Bordeaux and Paris green. Bud moth plentiful. Some bark louse.

2nd application, May 9th.—Fine and warm. Used Bordeaux and Paris green. Bud moth and tent caterpillar numerous, especially on unsprayed trees.

3rd application, May 22nd.—Fine and very windy. Used Bordeaux and Paris green. Bud moth and canker worm still bad on unsprayed trees.

4th application, June 3rd.—Fine and warm. Used Bordeaux and Paris green. About eighty-five per cent. of fruit has set.

5th application, June 13th.—Fine and warm. Used Bordeaux and Paris green.

6th application, June 29th.—Fine and warm. Used Bordeaux and Paris green.

Inspected Mr. Van Atter's orchard September 22nd. This is the first spraying it has had. It is kept in sod and bears well. The foliage and fruit on sprayed trees were free from fungus or worms, while on unsprayed trees there was considerable of both. Sprayed harvest apples did not crack as they usually do.

DRUMBO, OXFORD CO.—MR. MUMA'S ORCHARD.

1st application, April 30th.—Light rain two hours after spraying. Buds advanced. Leaf about one quarter grown. Used Bordeaux and Paris green. Some bud moth.

2nd application, May 11th.—Fine and warm. Used Bordeaux and Paris green. Tent caterpillar quite numerous.

3rd application, May 23rd.—Fine but very windy. Used Bordeaux and Paris green. A few canker worm here. There will be a good crop of apples.

4th application, June 4th.—Cloudy. Used Bordeaux and Paris green.

5th application, June 15th.—Fine and warm. Used Bordeaux and Paris green. Shower about three hours after spraying. Bark louse plentiful.

6th application, June 30th.—Fine and warm. Used Bordeaux and Paris green.

I inspected this orchard September 21st. The trees stand in sod, are well pruned and trunks scraped. Sprayed Spys bore forty per cent. more fruit than unsprayed Spys, and the fruit was much larger and fifty per cent. cleaner.

On Snow trees sprayed ninety-five per cent. of fruit was clean, while on unsprayed Snow trees only four per cent. was clean. Mr. Muma says this is the first crop of clean Snows for six years.

GALT, WATERLOO CO.—MR. J. M. ROBERTSON'S ORCHARD.

1st application, May 1st.—Fine and warm. Fruit buds advanced. Leaf about one-third grown. Used Bordeaux mixture. A few bud moth here.

2nd application, May 12th.—Fine and cool. Blossoms fully open. Used Bordeaux mixture. A few tent caterpillars and bud moth. Bark louse very plentiful.

3rd application, May 26th.—Fine but windy. Used Bordeaux and Paris green. Tent caterpillar and canker worm very bad. This is the first time Paris green has been used here.

4th application, June 5th.—Showers in evening. Used Bordeaux and Paris green. A full crop of fruit has set.

5th application, June 16th.—Fair and warm. Used Bordeaux and Paris green.

6th application, July 2nd.—Fine and warm. Used Bordeaux and Paris green.

I inspected this orchard on September 19th. The trees stand in sod, are in splendid condition and bear regularly. It has never been sprayed before. The fruit on the sprayed trees is larger and the foliage much better than on the unsprayed trees. Not much scab in orchard, except on Snows. By actual count, ninety per cent. of sprayed Snows and only ten per cent. of unsprayed Snows were clean. Mr. Robertson says this is the first crop of clean Snows in four years. He says he will continue spraying.

WATERLOO, WATERLOO CO.—MR. JACOB B. SHANTZ'S ORCHARD.

1st application May 2nd.—Cloudy and rain in afternoon. Buds well advanced. Leaves half grown. Used Bordeaux and Paris green.

2nd application, May 13th.—Fine and warm. Blossoms are beginning to fall. Used Bordeaux and Paris green. Orchard showing a moderate bloom. A few bud moths on sprayed trees, but less than on unsprayed trees. Canker worm and tent caterpillar plentiful. Trees infested with bark louse.

3rd application, May 27th.—Fine and warm. Light shower just as work was finished. Used Bordeaux and Paris green. About fifty per cent. of the blossoms have set.

4th application, June 6th.—Fine and warm. Used Bordeaux and Paris green. Very few canker worms to be found; none on sprayed trees. No signs of codling moth. This orchard will have ninety per cent. of a crop.

5th application, June 17th.—Fine and warm. Used Bordeaux and Paris green.

6th application, July 3rd.—Fine and very hot. Used Bordeaux and Paris green. No scab on sprayed Snows; other Snows very bad.

The following varieties were experimented upon: Spy, Ribstone, Greening, Russett, Snow, Swaar, Baldwin and Newton Pippin. This orchard is badly in need of pruning. A crop of corn was grown among the trees last yaar.

I inspected this orchard September 24th. Mr. Shantz tells me the orchard has not been sprayed before and that it bears regularly.

Results.

Snows, sprayed six times, 82 per cent. clean.

Snows, sprayed twice by Mr. Shantz, 21 per cent. clean.

Snows, unsprayed, 5 per cent. clean.

Newton Pippins, sprayed six times, 57 per cent. clean.

Newton Pippins, sprayed twice by Mr. Shantz, 50 per cent. clean.

Newton Pippins, unsprayed, 5 per cent. clean.

Swaar, sprayed six times, 68 per cent. clean.

Swaar, unsprayed, 4 per cent. clean.

The results would probably have been more marked in favor of the six applications had not the first and third applications been followed by rain within a few hours.

BRAMPTON, PEEL CO.—MR. FRANK HILLOCK'S ORCHARD.

1st application, May 4th.—Windy, and a shower when work was about half done. Blossoms well advanced. Used Bordeaux mixture.

2nd application, May 14th.—Fair and warm. Used Bordeaux and Paris green. Tent caterpillar very bad. Some bud moth.

3rd application, May 25th.—Spraying postponed on account of heavy rain. However, work was done two days later by Mr. Hillock. Tent caterpillar and bark louse very bad.

4th application, June 8th.—Cloudy, with occasional light showers. Used Bordeaux and Paris green. Full crop of apples here. Heavy rain in afternoon.

5th application, June 18th.—Fine and warm. Used Bordeaux and Paris green. Unsprayed trees badly eaten by caterpillar.

6th application, July 4th.—Cloudy, with light shower about one hour after spraying.

I inspected Mr. Hillock's orchard September 26th. It is kept in sod and bears regularly. This is the first regular spraying. Scab is quite bad on nearly all varieties. Snow apples have been so badly affected for last six years as to be worthless. This year they were quite clean and other varieties were better than ever before.

RICHMOND HILL, YORK CO.—MR. JOHN BROWN'S ORCHARD.

1st application, May 5th.—Fine, and high wind. Blossoms almost bursting. Leaf two-thirds grown. Used Bordeaux and Paris green.

2nd application, May 15th.—Fair, but strong wind. Blossoms nearly all fallen. Used Bordeaux and Paris green. Tent caterpillar and bark louse plentiful. A few bud moth on unsprayed trees.

3rd application, May 29th.—Cloudy, with showers in afternoon. Used Bordeaux and Paris green. Sprayed trees quite free from insects. Fruit has set well.

4th application, June 9th.—Had to be passed by on account of heavy rain.

5th application, June 19th.—Fair and warm. Used Bordeaux and Paris green.

6th application, July 6th.—Cloudy, and shower when work was half finished. However, after half an hour it cleared and work was resumed. Used Bordeaux and Paris green. Foliage on sprayed trees looks somewhat better than on unsprayed trees.

I inspected Mr. Brown's orchard September 29th. It stands in sod, and bears regularly. Mr. Brown has not done any spraying, but his orchard is remarkably free from worms and scab. He, however, thinks that the English Russet is better and more free from worms than in any former year.

DUNDAS, WENTWORTH CO.—MR. J. H. WILSON'S ORCHARD.

1st application, April 27th.—Work interrupted when half finished by light thunder shower. Used Bordeaux and Paris green. Bark louse bad.

2nd application, May 8th.—Clear and very warm. Used Bordeaux and Paris green. A profuse showing of fruit buds except in Spys. Some bud moth and canker worm.

3rd application, May 1st.—Fine and cool. Used Bordeaux and Paris green. Trees are looking fine, and fruit has set well.

4th application, June 3rd.—Fine and warm. Used Bordeaux and Paris green. Some canker worm on unsprayed trees but sprayed trees are clear. Some tent caterpillars at work.

5th application, June 15th.—Fine and clear, with showers at night. Used Bordeaux and Paris green. Some scab showing on unsprayed trees, but could find none on sprayed trees.

6th application, June 29th.—Clear and cool. Used Bordeaux and Paris green. Spy trees not bearing; from 85 per cent. to 100 per cent. of a crop on other trees. Found a few codling moth.

I inspected this orchard September 22nd. It is cultivated and fairly well pruned. Berries are grown between the rows. The orchard is in good condition, fruit and foliage looking well. The benefit of spraying was quite noticeable on Greenings, on which sprayed fruit was eighty per cent. clean and unsprayed, thirty per cent. clean.

BRANTFORD, BRANT CO.—MR. A. EDMONDSON'S ORCHARD.

1st application, April 28th.—Clear and fine. Buds just advancing. Used Bordeaux mixture. Bud moth very bad. Some caterpillars and bark louse.

2nd application, May 9th.—Fine and very warm. Used Bordeaux and Paris green. Bloom very heavy. Bud moth and caterpillar bad. Bud moth has done a lot of damage here owing to Paris green being omitted in the first application. About twenty people were present and I had hard work to persuade them to allow me to use the Paris green but finally succeeded.

3rd application, May 22nd.—Fine and warm. Used Bordeaux and Paris green. A few caterpillar and canker worm.

4th application, June 3rd.—Clear and warm. Used Bordeaux and Paris green.

5th application, June 16th.—Rained in morning, but fine and warm in evening. Used Bordeaux and Paris green. Canker worm still at work on unsprayed trees. Leaf roller quite bad. Spot showing slightly on unsprayed trees.

6th application, June 30th.—Fine and warm. Used Bordeaux mixture and Paris green. Foliage generally good. Found a few codling moth. Spot showing on Spy and Greening, but could not find any on sprayed trees.

I inspected this orchard September 21st. It is kept in sod, fertilized with farm yard manure and bears regularly. Has not been sprayed before. Fruit on the orchard was generally good. There is only one Snow tree in the orchard. It was sprayed and gave twelve barrels of clean fruit. This is the first clean Snows Mr. Edmondson has had in four years.

NORWICH, OXFORD CO.—MR. D. A. DAGER'S ORCHARD.

1st application, April 29th.—Clear and high wind. Fruit buds just showing. Used Bordeaux mixture and Paris green. Bud moth very bad and has done a lot of damage.

2nd application, May 11th.—Fine and warm. Used Bordeaux mixture and Paris green. Bloom fully open and profuse. Bud moth very bad, also canker worm and caterpillar.

3rd application, May 23rd.—Fine and high wind. Used Bordeaux and Paris green. Canker worm and tent caterpillar very bad. Sprayed trees have been damaged somewhat owing to mixture having been washed off by a heavy rain the morning after last spraying.

4th application, June 5th.—Fine and very warm. Very heavy rain the night after work was done. Used Bordeaux and Paris green. Canker worm and caterpillar very bad on unsprayed tree and a few on sprayed.

5th application, June 17th.—Fine and warm. Used Bordeaux and Paris green. Found some leaf roller.

6th application, July 2nd.—Clear and very warm. Used Bordeaux and Paris green. Saw some spot on unsprayed Harvest, Spy and Greening trees.

I inspected Mr. Dager's orchard and found the following results: Sprayed Greenings gave 90 per cent., and unsprayed Greenings 26 per cent. of clean fruit. All the Spy trees that were sprayed with one exception have a heavy crop of fine fruit free from scab or worms. The unsprayed Spys were a very light crop, not so clean nor uniform in size, nor was the foliage in as good condition.

WOODSTOCK, OXFORD CO.—MR. M. CLARK'S ORCHARD.

1st application, April 30th.—Shower three hours after work was done. Fruit buds just ready to open. Used Bordeaux mixture. Bark louse and bud moth very bad. Many were surprised when they were shown the extent of damage done by bud moth, as they did not know of it before.

2nd application, May 12th.—Fine and cool. Used Bordeaux and Paris green. Bloom profuse and fully open. Bud moth very bad, also some tent caterpillar and canker worm. Had a hard fight before being allowed to use Paris green.

3rd application, May 26th.—Clear with high wind. Used Bordeaux and Paris green.

4th application, June 6th.—Fine and warm. Used Bordeaux and Paris green. Fruit looks very clean.

5th application, June 18th.—Fine and hot. Used Bordeaux mixture and Paris green. Canker worm and leaf roller at work in unsprayed trees, none in sprayed trees.

6th application, July 3rd.—Fine and warm. Used Bordeaux and Paris green. Codling moth has been at work on unsprayed fruit. All present agreed that sprayed trees had better foliage and cleaner and larger fruit, and expressed themselves as being pleased with the results.

I inspected Mr. Clark's orchard on Sept. 16th. The orchard has not been sprayed before, and is in poor condition. I found the apple packers at work here. They say that they find much the best fruit on sprayed trees, especially among Snows, not one-quarter of which are fit to pack in unsprayed orchards In this orchard the sprayed Snows gave 85 per cent. of fruit fit for packing, while the unsprayed gave only 20 per cent.

INGERSOLL, OXFORD CO.—THOMAS HAYSLOP'S ORCHARD.

1st application, May 1st.—Fine and warm. Fruit buds just about ready to open. Used Bordeaux and Paris green. Some bud moth here.

2nd application, May 13th.—Clear with strong wind. Blossoms falling. Used Bordeaux and Paris green. Bud moth and tent caterpillar quite bad on unsprayed trees.

3rd application, May 27th.—Heavy shower just as work was starting; however it cleared shortly and work was proceeded with. Rained again later in the day. Used Bordeaux and Paris green.

4th application, June 28th.—Cloudy with very heavy rain just as work was finished. Used Bordeaux and Paris green. Mr. Hayslop will spray again when the weather settles. A few caterpillars on unsprayed trees.

5th application, June 19th.—Fine and warm. Used Bordeaux and Paris green.

6th application, July 4th.—Heavy rain all day so that work could not be done. However I prepared the mixture and Mr. Hayslop will apply it when it clears up.

I inspected Mr. Hayslop's orchard on September 16th. The orchard is part of young trees and part of old, and is fairly well pruned.

Fruit on Bellflower almost perfect; in previous years it gave ill-shaped, spotted and wormy fruit.

Greenings alongside sprayed three times showed considerable scab. Canada Red and Spy sprayed showed a remarkable contrast with unsprayed trees of the same varieties both in fruit and foliage.

A snow apple tree so situated that only part of it could be sprayed gave beautiful clean fruit on the sprayed side while the unsprayed side was loaded with fruit which was cracked and scabbed. Mr. Hayslop says that he has not had any clean fruit off this tree before for twelve years.

LONDON, MIDDLESEX CO.—MR. R. STEVEN'S ORCHARD.

1st application, May 2nd.—Fine but high wind. Used Bordeaux mixture. Leaf half grown. Fruit buds about ready to open, and some open. Foliage too far advanced to apply mixture well to limbs and twigs. It is about time when second spraying should be done. Bark louse bad and some canker worm.

2nd application, May 14th.—Clear and high wind. Used Bordeaux and Paris green. About half the bloom has fallen. Canker worm very bad, and a few bud moth and tent caterpillar here. Heavy showers in the evening. Wrote asking Mr. Stevens to repeat application.

3rd application May 28th.—Cool and very high wind. Used Bordeaux and Paris green. Some caterpillar at work. Orchard was not sprayed after rain following second spraying.

4th application June 9th.—Cloudy, with a light sprinkle at night and rain next day. Used Bordeaux and Paris green. Canker worm and caterpillar still at work, but only a few on sprayed trees. Scab showing quite bad.

5th application, June 20th.—Fine and very hot, with a shower next day. Used Bordeaux and Paris green. A few codling moth. Scab very bad here. Some on sprayed trees.

6th application, July 6th.—Cloudy and high wind. Used Bordeaux and Paris green. Scab very bad. Some codling moth.

I inspected Mr. Stevens' orchard Sept. 29th. It is in very good condition and well pruned. Snow apples which were sprayed were almost perfect, while those which were not were badly scabbed and wormed. Canada Red trees sprayed showed good foliage and a fine crop of clean fruit, while on unsprayed trees of the same variety the foliage was in bad condition and the fruit almost worthless from scab and worm. All varieties experimented upon, including Alexander, Baldwin, Wine, Canada Red, Greening, Spy, Snow and Harvest, were decidedly better where sprayed.

Results were not as great here as they would have been owing to first application being made much too late, and also to second and third applications having been followed by heavy rains.

ST. MARYS, PERTH CO.—MR. JOHN LEGGE'S ORCHARD.

1st application, May 4th.—Fine and very high wind. Very much advanced, fruit buds showing color. Used Bordeaux mixture and Paris green. Trees very small for their age and badly in need of pruning. A poor orchard for a fair test. It stands on the north side of a hill in a tough, old sod. Bark louse very bad, and a great many bud moth and tent caterpillar.

2nd application, May 15th.—Cool and high wind. Used Bordeaux and Paris green. Bud moth and caterpillar at work on unsprayed trees. Sprayed trees fairly clean.

3rd application, May 29th.—Cold and heavy wind storm. Used Bordeaux and Paris green. Wind was so high trees could only be sprayed on one side, and that unevenly.

4th application, June 10th.—Clear and high wind. Used Bordeaux mixture and Paris green. Canker worm attacking unsprayed trees.

5th application, June 22nd.—Clear, with high wind. Used Bordeaux and Paris green. Foliage good. Scab showing on unsprayed trees. Sprayed trees clean.

6th application, July 7th.—Clear and high wind. Used Bordeaux and Paris green. A few codling moth found, but only on unsprayed fruit.

I inspected this orchard September 17th. A noticeable difference in Snow, Duchess and Russett, sprayed and unsprayed. Seventy-five per cent. of sprayed Snows were perfect, and twenty per cent. of unsprayed, with advantage in size of fruit and in foliage for sprayed trees.

STRATFORD, PERTH CO.—MR. S. J. MONTEITH'S ORCHARD.

1st application, May 5th.—Fine and warm. Used Bordeaux mixture. Leaf one-third grown. Fruit buds showing color. Some bud moth and bark louse, and a lot of caterpillar nests here.

2nd application, May 16th.—Fine and warm. Used Bordeaux and Paris green. Bud moth still at work. Lots of tent caterpillar and canker worm.

3rd application, May 30th.—Cloudy and cool. Used Bordeaux and Paris green. Fruit well set and foliage good on sprayed trees. A few caterpillar and canker worm still at work on unsprayed trees.

4th application, June 11th.—Clear and fine. Used Bordeaux mixture and Paris green. No scab yet.

5th application, June 24th.—Clear and high wind. Used Bordeaux and Paris green. A little scab showing on unsprayed fruit.

6th application, July 8th.—Fine and warm. Used Bordeaux mixture and Paris green. Found a few codling moth in unsprayed fruit. People here well satisfied with experiment.

I inspected Mr. Monteith's orchard on September 17th. First year of spraying. Orchard cultivated and in very good condition. Not much scab, except on unsprayed Snow apples, which were scabbed and wormy. All sprayed trees are showing fine fruit and foliage.

DURHAM, GREY CO.—MR. DAVID JACKSON'S ORCHARD.

1st application, May 6th.—Fine and warm. Used Bordeaux and Paris green. Fruit buds just showing. Bark louse bad, and some bud moth and caterpillar nests.

2nd application, May 18th.—Fine and high wind. Used Bordeaux and Paris green. Blossoms about all fallen.

3rd application, June 1st.—Clear and very cool. Used Bordeaux and Paris green. Caterpillar is working on unsprayed trees.

4th application, June 12th.—Fine and warm. Used Bordeaux and Paris green. A few canker worm and leaf roller at work in orchard. A little scab appearing on unsprayed trees.

5th application, June 25th.—Clear and warm. Used Bordeaux and Paris green. No scab on sprayed fruit.

6th application, July 19th.—High wind and showers in evening, with prospect of a rain. Used Bordeaux and Paris green. Foliage very fair on most trees. Codling moth very scarce.

I inspected this orchard September 18th. The orchard stands in an old sod and needs pruning. It bears regularly. Snow apples which were experimented upon were free from scab and worm for first time in twelve years. The same is true of Strawberry Pippin, and all varieties show larger and better fruit on sprayed trees. Mr. Jackson says that the question of controlling scab on apples is settled in his mind beyond a doubt.

FERGUS, WELLINGTON CO.—INDUSTRIAL HOME ORCHARD.

1st application, May 7th.—Fine and warm. Fruit buds just showing. Used Bordeaux mixture. Some bud moth. Bark louse bad, and lots of caterpillars nests.

2nd application. May 19th.—Mild and clear. Used Bordeaux and Paris green. Most of the bloom has fallen. Caterpillar quite bad.

3rd application, June 2nd.—Warm and high wind. Used Bordeaux and Paris green. A few canker worm here.

4th application, June 13th.—Clear and warm. Used Bordeaux and Paris green. Foliage in good condition.

5th application, June 26th.—Clear and high wind, so that spraying could only be done from one side. Used Bordeaux mixture and Paris green. Scab showing a little on some trees, but did not see any on sprayed trees.

6th application, July 10th.—Cloudy, with high wind and mist, also light rain at times. Used Bordeaux and Paris green. Very little codling moth.

I inspected this orchard September 18 h. It is in good condition and fairly well pruned. Fruit and foliage are looking well. Very little scab on any trees. First clean Snow apples for years.

Oakville, Halton Co.—Mr A. Chisholms' Orchard.

1st application, April 27th.—Cool and cloudy, with light rain in afternoon. Leaf bud just opening. Used Bordeaux and Paris green.

2nd application May 8th.—Fine and warm. Used Bordeaux and Paris green.

3rd application, May 21st.—Fine and warm. Used Bordeaux and Paris green. About 75 per cent. of blossoms have set This orchard is badly infested with bark lice.

4th application, June 3rd.—Fine and warm. Used Bordeaux and Paris green. Foliage looking well and free from injurious insects.

5th application, June 15th.—Fine and warm. Used Bordeaux and Paris green.

6th application, June 29th—Fine and warm. Used Bordeaux and Paris green. Foliage and fruit are looking fine. No scab or codling moth.

I inspected this orchard on September 25th. The land is a sandy loam, well cultivated. The orchard is fairly well pruned and bears regularly. It has never been sprayed before. The fruit is remarkably free from fungus, except the unsprayed Snows, which had forty-five per cent. of crop scabbed, while sprayed Snows had much larger, finer fruit, and only eight per cent. scabbed.

Agincourt, York Co.—Mr Patterson's Orchard.

1st application, April 28th.—Clear and warm. On most varieties buds are just showing signs of opening; a few are more advanced. Used Bordeaux and Paris green.

2nd application, May 9th.—Fine and warm. Used Bordeaux and Paris green. Orchard is showing a moderate bloom. Caterpillars quite numerous. Some bark lice.

3rd application, May 22nd.—Warm with a strong wind. Used Bordeaux and Paris green. From 30 per cent to 75 per cent of blossoms have set on various varieties. Spy and Red Astrachan not bearing this year. Caterpillar and canker worm have been at work.

4th application, June 4th.—Fine and warm. Used Bordeaux and Paris green.

5th application, June 16th.—Fine and warm. Used Bordeaux and Paris green. Bark louse and flat-headed borer have been doing considerable damage. Some scab, mostly on Snows

6th application, June 30th.—Fine and cool. Used Bordeaux and Paris green.

Inspected this orchard September 29th and found it in a good state of cultivation and well pruned. It was sprayed and manured last year and bears regularly. No signs of scab and very few worms. Nearly all the Snow apples are affected with Gloeosporium or bitter rot.

Uxbridge, Ontario Co.—Mr. T. A. Britton's Orchard.

1st application, April 29th.—Clear and windy. The earlier varieties are just opening. Used Bordeaux and Paris green.

2nd application, May 11th.—Fine and warm. Buds are just opening and are very profuse. Used Bordeaux mixture. Trees are badly infested with bark louse and caterpillar.

3rd application, May 23rd.—Fine and cool. Used Bordeaux and Paris green. From 50 per cent. to 75 per cent. of blossoms have set. Canker worms have been working on some trees.

4th application, June 5th.—Fine and warm. Used Bordeaux and Paris green.

5th application, June 17th.—Fine and warm. Used Bordeaux and Paris green Flat-headed borer has done considerable damage in this orchard. There is some appearance of scab.

6th application, July 2nd.—Fine and warm. Used Bordeaux and Paris green. Foliage and fruit looking good. Very little sign of scab or Codling moth.

I inspected this orchard September 29th. The ground is a sandy loam. The orchard is kept in sod and bears well. It is in need of pruning. Has not been sprayed before. I found no scab on either the sprayed or unsprayed trees, but some unsprayed trees had considerable wormy fruit.

LINDSAY, VICTORIA CO.—MR. JOHN MCDONALD'S ORCHARD.

1st application, April 30th.—Fine, but high wind. Buds just opening. Used Bordeaux mixture.

2nd application, May 12th.—Cloudy and cool. Used Bordeaux mixture. The blossom on this orchard is profuse. They are fully open on most varieties. Trees are badly infested with tent caterpillar and bark louse.

3rd application, May 26th.—Cool and high wind. Used Bordeaux and Paris green. From 40 per cent. to 50 per cent. of blossoms have set.

4th application, June 6th.—Very warm. Rain a few hours after spraying. Used Bordeaux and Paris green.

5th application, June 18th.—Fine and warm. Used Bordeaux and Paris green. Both flat headed borer and round-headed borer are doing considerable damage. Some appearance of scab.

6th application, July 3rd.—Very warm. Rained about four hours after spraying. Foliage and fruit looking first-class.

I inspected Mr. McDonald's orchard September 30th. The ground is a clay loam and is not cultivated. The fruit and foliage on both sprayed and unsprayed trees are in good condition. There is very little wormed fruit and no scab except a little on unsprayed Snows.

MILLBROOK, DURHAM CO.—MR GEO H. SOOTHERAN'S ORCHARD

1st application, May 1st.—Warm, with light rain. Leaf buds just opening. Used Bordeaux and Paris green.

2nd application, May 13th.—Fine and warm. Used Bordeaux mixture. The blossom is profuse and fully open.

3rd application, May 27th.—Cloudy and rain before spraying, but cleared after work started. Used Bordeaux and Paris green. Spy and Greening not bearing this year. On others about 50 per cent. of blossom has set.

4th application, June 8th.—Cloudy with rain in afternoon. Used Bordeaux and Paris green. Foliage looks well.

5th application, June 19th.—Fine with high wind. Used Bordeaux and Paris green. Some scab showing.

6th application, July 4th.—Rained so heavily that work could not be done.

I inspected this orchard October 1st. The soil is a clay loam and not cultivated. The trees are too close and in need of pruning. It bears regularly. Fruit and foliage are in good condition on both sprayed and unsprayed trees, but sprayed trees are 25 per cent. more free from worms than unsprayed. This is the first clean crop for some years Some years 30 per cent. of crop are unfit to pick on account of scab and worms.

PETERBORO', PETERBORO' CO.—MR. E. B. EDWARD'S ORCHARD.

1st application, May 2nd.—Fine and warm. Leaf buds just opening. Used Bordeaux mixture.

2nd application, May 14th.—Fine and warm. Used Bordeaux mixture. The trees are profusely covered with bloom which is fully open. Trees badly infested with tent caterpillar and bark louse. There are also some bud moth.

3rd application, May 28th.—Heavy rain so that work could not be done. Arranged with Mr. Edwards to do work when it cleared.

4th application, June 9th.—Work had to be postponed on account of rain.

5th application, June 20th.—Fine and warm. Used Bordeaux and Paris green. Snow, Spy and Red Astrachan not bearing. On other varieties from 50 per cent. to 100 per cent. of fruit has set.

6th application, July 6th.—Cloudy with light rain. Used Bordeaux and Paris green. Fruit is looking well but some of the trees are badly affected with twig blight.

I inspected this orchard October 1st and found it in good condition and cultivated. This is the third year it has been sprayed. The sprayed fruit was quite free from worms, which were numerous in the unsprayed. The unsprayed trees were infested with caterpillars while those which were sprayed were clean.

TWEED, HASTINGS CO.—MR. ROBERT GORDON'S ORCHARD

1st application, May 4th.—Weather showery. Leaf buds well advanced. Used Bordeaux and Paris green

2nd application, May 15th.—Fine and windy. Used Bordeaux and Paris green. Orchard showing a moderate bloom. Bark louse and tent caterpillar numerous.

3rd application, May 29th.—Rain one hour after work was done. From 50 per cent. to 75 per cent. of fruit has set.

4th application, June 10th—Fine and high wind. Used Bordeaux and Paris green.

5th application, June 22nd.—Fine and warm. Used Bordeaux and Paris green.

6th application, July 7th.—Cloudy and cool. Use Bordeaux and Paris green. Foliage and fruit look good, very little scab.

I inspected this orchard Oct. 2nd and found it well cultivated and free from fungus on leaves or fruit. The orchard has never been sprayed before this year. On Ben Davis' trees standing side by side, one sprayed and the other unsprayed, the result was very noticeable. The sprayed fruit was free from worms while 30 per cent. of the unsprayed was wormy.

PERTH, LANARK CO.—MR. CYRUS DAVIS' ORCHARD.

1st application, May 5th.—Fine and warm. Buds well advanced. Leaf just opening. Used Bordeaux mixture.

2nd application, May 16th.—Fine and warm. Used Bordeaux and Paris green. This orchard is showing a moderate bloom. Found a few tent caterpillar and bark louse.

3rd application, May 30th.—Cloudy and cool. Used Bordeaux and Paris green. From 50 per cent. to 60 per cent of blossoms have set. Saw some canker worms.

4th application, June 11th.—

5th application, June 24th—Fine and warm. Used Bordeaux and Paris green. Foliage looks well.

6th application, July 8th—Fine and warm. Used Bordeaux and Paris green.

On inspecting Mr. Davis' orchard I found it to be well cultivated. It was sprayed last year. Sprayed trees were in perfect condition both as to fruit and foliage, being 90 per cent better than unsprayed.

SMITH'S FALLS, LANARK CO.—DR. MCCALLUM'S ORCHARD.

1st application, May 6th.—Cool and cloudy. Used Bordeaux and Paris green.

2nd application, May 18th.—Fine and warm. Used Bordeaux mixture. The bloom here is profuse and fully open.

3rd application, June 1st.—Fine and warm. Used Bordeaux and Paris green. Trees are young and healthy.

4th application, June 12th.—Fine but windy. Used Bordeaux and Paris green. Bark louse on two or three old trees young ones not affected.

5th application, June 25th.—Cloudy. Used Bordeaux and Paris green.

6th application, July 9th.—Cloudy with rain an hour after application. Used Bordeaux and Paris green. Some twig blight.

Inspected Dr. McCallum's orchard Oct. 6th. It is well cultivated. Neither worms nor fungus have attacked the orchard this year. Have been troubled with both previous years, but never very seriously. A hailstorm on July 28th injured the fruit and trees badly. The orchard was never sprayed before.

Winchester, Dundas Co.—Mr. Jas. P. Fox's Orchard.

1st application. May 7th.—Fine and warm. Buds well advanced. Leaf just opened. Used Bordeaux mixture.

2nd application, May 19th.—Fine and warm. Used Bordeaux and Paris green. The bloom on some varieties is heavy on others only moderate. It is almost all fallen. Bark louse are very bad and some tent caterpillars.

3rd application, June 2nd.—Fine and windy. Used Bordeaux and Paris green.

4th application, June 13th.—Fine and high wind. Used Bordeaux and Paris green.

5th application, June 26th.—Fine and warm. Used Bordeaux and Paris green. Foliage and fruit looking well.

6th application, July 10th.—Fine and warm. Used Bordeaux mixture. Some twig blight.

I inspected this orchard on Oct. 5th. It stands in sod, and bears regularly Has not been sprayed before. Fruit and foliage in perfect condition as far as fungus is concerned and very few worms.

General Observations.

The preparation and application of insecticides and fungicides is not an exact science, and no one should hesitate to undertake the spraying of his orchard. For although to obtain the best results experience is necessary, yet much good can be done even should the work not be done exactly as recommended.

The most important point is to make the application just at the time it will be most effectual in accomplishing the object for which it is applied.

The fruit crop is the second most valuable crop grown in Ontario, and the industry is still in its infancy. Therefore it is necessary that all possible assistance and information should be given to the fruit growers in order to assure success.

I have been strongly impressed with the importance of spraying during the fourteen years I have done it on my own fruit farm, and more than ever after the knowledge gained while conducting the experimental work this year.

I think it highly important that the work be continued, and that a bulletin be published treating in as plain a manner as possible of a few of the most important insect enemies. It should be illustrated with cuts of these insects at their different stages of development so that they could easily be recognized and should contain information as to the seasons at which the various stages are attained and the best manner of destroying them at each stage, so that the orchardist would be on the watch and know at once what remedy to apply.

The consensus of opinion expressed by fruit growers and business men throughout the Province, has been that for the expenditure incurred the Minister of Agriculture has conferred as great a boon upon the fruit growers of the Province as he has in any other direction, in developing, as he has, a policy which aims to benefit the agricultural classes.

NINTH ANNUAL REPORTS

OF THE

INSPECTORS OF FACTORIES

FOR THE

PROVINCE OF ONTARIO

1896.

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NINTH ANNUAL REPORTS

OF THE

INSPECTORS OF FACTORIES.

WESTERN DISTRICT.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to submit the following Report of Factories' Inspection in the Western District of the Province for the year 1896. In going my round of inspection this year I found about the same stagnation in the manufacturing trades that existed for some years past, the depression continuing with but very little relief in a few branches. As a whole there was but little improvement, and some lines of manufacture experienced a still duller market than before. In many of the smaller factories this state of things so reduced the number of employees as to bring them below six, the number necessary to constitute a factory under the Act. The agricultural implement makers seemed to have a fair demand for their products, and the bicycle manufacture is an industry that has developed very fast, no less than three new factories in this line having been started in the Western District this year, one each in Toronto, Woodstock and Goderich. The outlook for the coming season is better, but I do not think it will make any material difference so far as the Factories Act is concerned, in the employment of children under the age of 14 years, or in working females longer than sixty hours a week.

About the same number of permits to work over-time was granted as in former years, but these were sought rather on the ground that the time for delivery of goods was limited, the orders being received late, than that there was any rush in business. Confectioners were an exception to this, as they require the permit regularly every fall a few weeks before Christmas, which is their busy season, and it is requisite to have the candies as fresh as possible.

This year has not been remarkable for anything unusual in factory inspection unless it be a greater number of fatal accidents, of which I will write more at length further on. All is going along nicely, the proprietors are conforming to the law fairly well and there has only been one prosecution, viz., the Parisian laundry, for working their females longer

than 60 hours a week. There have been more fire escapes erected, and the clause in the Act requiring ropes to be provided for fire escape purposes has been very well complied with.

A considerable portion of my time this year has been devoted to inspection of bake-shops under the law enacted last session, of which I will write more fully further on in this report.

The Western District has been altered by taking from it the counties of Wentworth and Lincoln, and adding to it the counties of Grey, Simcoe and Dufferin. The industries of these northern counties are chiefly the manufacture of lumber, leather, occasionally a small woollen mill and some manufacturing hosiery, and the usual planing mills and repair shops found in all country villages. The lumber trade has been quiet for some time past, and consequently some of the mills were either idle at the time of my visit or were running short handed with one-half or less than their usual staff.

Accidents.

There were ninety accidents reported this year against seventy-five last year. The increase may be accounted for, by a change in the Act requiring all accidents, from any cause whatever, to be reported if the person injured was kept from returning to his work within six days. So now an accident from falling or from a machine worked by hand is reportable if it results in six days' idleness, which was not formerly the case.

This change in the Act must necessarily increase the number of accidents reported without any chance of the inspector placing any protection for a decrease. There are seven reported this year which would not have been under the law as it was formerly. It will still leave eighty-three, an increase of seven over the previous year. But a small proportion of the accidents reported this year come under the class called preventable. As an instance a boy lost a finger of each hand by fooling with a string which wound around a shaft of a turning lathe, pulling the fingers off. The inspector is powerless to prevent this class of accidents. Another boy had the sinew of a finger pulled out from a similar cause. Five men received injuries by falling, and one from a bin of shavings taking fire in the boiler-room. There is no protection for this class of accidents. This year I have had reported to me fourteen fatal accidents: six killed by boiler explosions, one struck on the head by the stem of crane crank, one caught in shafting, one struck by a stick with which he was putting on a belt, one supposed to have been caught by a countershaft, one cut from hip to shoulder by an equalizing saw, one struck by a stick thrown from a saw, one supposed to have caught in the engine fly-wheel, one caught in a belt being laced. This is the greatest number of fatalities happening in any year in the Western District since factory inspection began. Of the seventy-six non-fatal accidents, twenty-seven happened from wood-working machinery, though they were not all cuts, three being from a sanding machine, one from being caught in the rollers of a planer. In the metal trades there were fourteen accidents, six of which were caused by presses and, three from molten iron. Cogs caused five accidents, some of which were met with in cleaning in motion. Belts are responsible for five accidents, two of which were fatal. The remainder were from various causes, such as elevator, explosion of lamp, emery wheel,

drill, weight falling, lathes, chips flying, etc. The result of the accidents were eighty fingers badly damaged or cut off, injuries to five hands, five arms, four legs, seven feet, two faces, one eye, one collar-bone broken, one shoulder dislocated, two ribs broken, one chest, one back hurt, and four people burned. Among those receiving injuring were four females the most serious of which, one had her collar-bone broken and one lost two fingers in cogs.

Explosions.

The following is a list of explosions which have come to my knowledge this year, four of them being boiler explosions :

March 8, H. E. Palmerton, Charlotteville, boiler in a saw mill, killing one man and two others hurt.

April 6, Watson Bros., Ridgetown, boiler of a stave mill, four deaths.

September 16, Pettit Bros., near Comber, boiler of a stave mill, killing one man, the only one present, about 2.30 a. m.

Nov. 16, Robinson Bros., Parkhill, boiler of a saw mill; killing a little girl in garden, striking her with a brick ; and so injuring Mr. Robinson as to cause his death.

Other Explosions.

Feb. 9, G. T. Pendrith's bicycle works. A bicycle tube, filled with rather damp sand, plugged at the ends, when heated and soft, blew out a hole, causing hot sand to fly in the workman's face. He was not seriously injured, being idle but three days.

Dec. 26, at George Sleemin's brewery, Guelph, two men were varnishing a large cask with a solution of shellac in alcohol. They were inside with a lamp, in a short time the alcohol fumes accumulated sufficiently to cause a violent explosion. The men were seriously burned before they could escape by the manhole. They were sent to the hospital.

The sawmill of Messrs. Robinson Bros. did not come under the Act, but I have always taken note of boiler explosions whether the mill or factory came under the Act or not ; if not coming under the Act, I did not include the names of the injured in the accident list. There are comparatively few explosions of boilers, and they are chiefly of old boilers.

The Bake Shops Act, 1896.

This Act came into force in April last, and towards the end of the month I began the inspection of bake shops in Toronto, west of Yonge street. I did not make it a point to inspect all of the bake shops in that district, but only in places where I visited for the purposes of factory inspection. Thus I inspected 348 bake shops, of which 96 were in Toronto, west of Yonge street ; 37 in London ; 16 in Brantford ; 9 each in Chatham and Guelph, 8 in Galt ; 7 each in Stratford and St. Thomas ; 11 in Woodstock ; 6 in Windsor ; 5 each in Simcoe, Goderich and Collingwood ; 4 each in Paris, Orillia, Sarnia, Wingham and Berlin ; 3 each in Paisley, Mt. Forest, Owen Sound, Mitchell, Essex, Acton, Parkhill, Strathroy, Petrolia, Ingersoll, Niagara Falls, Waterloo, Preston, Clinton and Barrie ; 2 each in Listowel, Chesley, Harriston, Seaforth, Georgetown, Wallaceburg, Elora, Norwich,

Walkerton, Leamington, Orangeville, Penetanguishene, Forest, Lucknow, Palmerston, St. Mary's, Tilsonburg, Southampton, Wiarton, Hespeler, Oakville, Kincardine, Shelburne, Midland, Milton, Fergus and Exeter; and 1 each at Port Stanley, Elmira, Hepworth, Walkerville, Staples, Glencoe, Baden and Hanover.

Of the 96 bake shops in Toronto, I found 40 of them to be in basements, and 5 in half basements, which were fairly lighted; but of those wholly underground, few were lighted sufficiently to work in, and some were so dark that gas or lamps had to be used while work was going on, and, as a rule, ventilation was bad. In some, all the light and air came in through small windows, under the sidewalk, and the grating obscured a portion of the light. Some ovens were built at the front end of the room, thus shutting out the light, and the fresh air that came in had to pass over the warm oven before it reached the workers. The ceilings for the most part were low, and in some were too low for a tall man to stand upright in.

In many of the bake shops in basements, the conditions for health were unfavorable. Where the work of baking is carried on in such dark places, it was impossible to see if they were as clean as they ought to be. There is not the same disposition to keep them clean and tidy as there would be in places better lighted. I believe it would be well, as has been done in Britain, to allow no new bake houses to be built below ground after a certain date.

In a few basement bake houses I found smells of sewer gas, coal gas, and in some a sour putrid smell of decomposed flour that had sifted through the cracks in the floor to the wet ground underneath; in others I found a waste pipe or a drain leaking into the shop. I took means to remedy these evils, either myself or through the local Board of Health. I do not wish to infer that all the basement bake shops were in an untidy or unhealthy condition, for such is not the case; on the contrary, some were quite clean and tidy, the only objection being insufficient light; but a few were even worse than I have attempted to describe. I found about the same conditions existing in the other towns and cities as in Toronto. In Brantford I found a bake shop in the cellar, very poorly lighted. The work was done for the day, a pile of flour was laid on the top of the trough, and beside it was an open rat trap—very suggestive. One does not like to think of rats running over what is being prepared to eat. In Goderich, as I was coming out of a bake shop on the ground floor, I encountered a huge rat making for his hole. He looked fierce enough to attack me, for I was between him and his hole. The rats, water bugs and cock-roaches are pests the bakers would like to get rid of.

As to those bake shops above ground, there are all sorts and conditions, from small, dirty, dingy ones, to fine, large, airy, clean and comfortable establishments, though the latter are the exception. Some are so small that there did not seem to be room for a man to work. These were mostly in the country places, and some of them seemed to be in mere outhouses. Some were larger and more roomy, with ceilings and walls plastered or boarded. Some painted, others lime washed, and others again did not seem to have either since they were first occupied, although some proprietors lime-washed one, two, three, or more, times a year. Most of those above ground seemed well-lighted, although the ventilation was defective in many. Nearly all shops were swept daily; many scraped the floors daily and

others weekly. Some bake houses recently built for the purpose, were of brick, two storeys, with ovens on the ground floor, which is of concrete, and the storing and kneading is done by machinery on the floor above. Some of these have closets, washrooms, sinks and towels, all very complete. The floors in bake houses were of many varieties. Some of the boards were smooth and tight, others were of loose boards, with open cracks. In some the boards were very much dilapidated, and quite worn where the men worked; others again were of cement or concrete, hard and dry, some of bricks were evenly laid; others were of same material, roughly laid, and some were of cobble stone, which is difficult to be kept clean.

In some of the smaller shops, the only convenience for washing was a pail or vessel of water. That is good enough if those using them would but renew the water often, but I saw plenty of evidence that it was not done. Again, in a few, the towels were filthy, but when I drew their attention to them, a more plentiful supply was promised. In many of the larger shops, i. e., shops where two or more men were employed, each baker had his own towel. I had occasion to speak to the proprietors of some shops, and mentioned that if the public knew of the untidy condition they would take away their custom. Some proprietors complained of their bakers being slovenly, and others spoke with pride of the tidy habits of their men.

In the matter of ventilation and light, there were some bake shops that, to have them in conformity with the Act, was impossible. My instructions, however, did not authorize me to have them vacated.

The clause limiting the hours of labor for bakers to 60 a week (I think the only instance where the hours of labor for men are limited by law in the Province) is a very popular one among the journeymen bakers. In some shops I found the hours from 9 to 10 a day, but in others they were from 11 to 15 at times, according to the urgency, and this, I understood, without extra pay for the overtime, as an offset to not being docked for holidays. I learned from these bakers that they did not object to working so much if they received pay for it. It is impossible to know if overtime is being worked without the men complain of it, and if they are paid for the overtime so worked it is not likely they will complain of it. I have only two or three complaints on that score. The law provides for overtime work on application to the Inspector.

Section 5 of the Act reads: "The sleeping place or places of the employees of every bake shop shall be entirely separate from the bake shop, and no person shall be allowed to sleep in such bake shop."

I could not learn of any of the men sleeping in the bake shop, though I inquired at every shop I visited. I found in Brantford one man at midday sleeping on the trough. He had been whitewashing, and at noon had laid down on the trough, and quite naturally he fell asleep, and had not awakened when I called shortly after one o'clock p.m.

Section 8 of the Act reads as follows:—"No employer shall knowingly require, permit or suffer any person to work in his bake shop who is affected with consumption of the lungs, or with scrofula, or with any venereal disease, or with any communicable skin

disease, and every employer is hereby required to maintain himself and his employees in a clean and healthy condition while engaged in the manufacture, handling or sale of such food products."

The Inspector can do but little to enforce it. The onus falls on the employer for the most part. In inspecting I called at some bake shops in the afternoon, and did not see the men, they having finished for the day, they having begun to work early and finished early, that is so far as bread bakers are concerned. Cake and pastry bakers work the usual day's work of about 10 hours, but those on bread in cities, for the purpose of having fresh bread for breakfast, had to begin to work at all hours—8, 9, 10, 10:30, 11 and 12 p.m., 2, 3, 4, 5 and 6 a.m., and so many of the shops were deserted when I called in the afternoon. In the smaller country places the early bread is not so much of an object. In some bake shops there is no work done on Saturday afternoon. In some of the shops I visited my attention was drawn to the very cleanly condition of the bread pans, tins, dishes and other utensils in use, which was very creditable, but it was not as common as I would like to see it. Without exception the troughs in all were clean. A few proprietors invite the public to inspect their shops any time during working hours. I found the journeymen as a rule to have tidy appearance at their work, and they are for the most part young men, between 20 and 30 years of age. They seemed quite willing to give me any information in their power. Some of the bosses I felt were not so frank with me, in particular in regard to the working hours of their men, if they worked over 60 hours, and when the bosses were present one could not always ask concerning this matter from the men. There are cases where the men would have the choice of either telling a falsehood or telling the truth and lose their job. I did not like to put them in this position. I asked the bosses in the presence of their men, who would hear the reply, and if it was not in accordance with the facts they would have to let me know by letter or some other way if they felt it to be a grievance.

In some bake shops in the cities I found that where only one man is employed, and he could not finish up his work in 10 hours, and there is not enough work to warrant employing another man, the man would work a half-hour or longer to finish. This puzzled me how to deal with at first, as I did not wish to have the man working over 60 hours a week, nor injure the proprietor by curtailing his business. But I soon found out that in cities at least there are always idle bakers who can be engaged by the hour for any reasonable length of time, thus there is not any excuse to regularly work a man over 60 hours a week.

Among the proprietors of bake shops on whom I called I found :

24	employing	1	baker or helper
13	"	2	"
10	"	3	"
3	"	4	"
5	"	5	"
4	"	6	"
1	"	8	"
29			

By far the large majority (67) employ no help. Many are small affairs, and some are operated by housewives making " home-made " bread, for which there is an increasing

demand. In some of these the baking was done in the kitchen in ordinary cooking stoves, which were very clean. Many now use a portable oven made of iron, and a great many bakers have attached to their ovens a Pyrometer for telling the temperature, and some more recent ovens are so arranged that one can see inside without opening the doors.

While the inspection of bake shops as a whole shows them fairly clean as an average, it does not do away with the fact that some are far below the mark; but these will improve in condition. I am satisfied that the first inspection has been the means of making a great improvement on the lines the Act calls for, and that the next visit will show a change for the better, particularly in the matter of cleanliness.

The Tenth Annual Convention of the International Association of Factory Inspectors of North America was held in Toronto during the first week in September. Through your kindness the meetings were held in the Parliament Buildings. Col. Charles H. Morse, Commissioner of Labour, Lansing, Michigan, President, occupied the chair. Many interesting and instructive papers were read, and I have no doubt that all present profited by their attendance. It was pronounced to be a successful gathering, and the delegates expressed themselves as being well pleased with their visit to Toronto. Among other business the following resolution was passed:—Resolved, "That the delegates to this convention, fully appreciating the courtesies which have been extended to them throughout their sessions and during their stay in the city of Toronto, hereby tender their sincere thanks to the Hon. John Dryden, Minister of Agriculture, and to Mr. Alderman Scott, acting for the mayor, for their addresses of welcome. Our thanks are due also, and are hereby tendered, to the corporation of the City of Toronto for courtesies extended to the members of the convention."

I have the honor to be
Your obedient servant,

ROBERT BARBER.

Factories Inspector Western District,
Toronto, January 31st, 1897.

CENTRAL DISTRICT.

To the Honorable the Minister of Agriculture :

Sir,—I have the honor to submit the following report on Factories Inspection, for the Central District of Ontario for the year 1896.

Age of Children.

Having frequently referred to the difficulty of verifying the ages of children, owing to the parents neglect to register their births, I would again, as in a former report, suggest that children on leaving school should be granted a certificate as to age, as also the standard of proficiency to which they had attained. And that no child or young person, when first beginning to work, should be allowed to do so unless such certificate is in the possession of the employer of such child or young person.

Overtime.

A case was reported where an overtime permit was granted and one girl had been off work half a day through sickness. But having worked half a day under the permit, and made sixty hours during the week, yet she was mulcted half a day's pay. Also the other females who worked under the permit, over the sixty hours did not receive any pay for such overtime. It would appear that the employer considered that permission to work overtime carried with it immunity from paying for such work. I never heard of such a case in all my experience. It might be well in future, to ascertain whether payment is intended to be given for overtime, before granting permits. As some seventy females were employed, and five hours and one half hour were worked by each, the permit in this case acted as a labor saver, in that at least six additional females might have been employed and as a provider of cheap labor as well.

Dust.

Three of the Hamilton stove foundries have been very dilatory in providing means for the removal of dust. Having notified them to comply with the requirements of the Act within two months, and they not having done so, I gave the matter into the hands of the Crown Attorney, with the result that one of them reported having provided a fan and the remaining two have notified me, that they will have changes made for the removal of the dust before starting up again. Were the owners of the foundries, to put themselves in the place of their men who have been inhaling the dust for so many years, "hard times" would not be considered a sufficient excuse for non-compliance with the requirements.

Boiler Inspection.

Although, fortunately, I have no boiler explosion to report, yet the necessity for inspection still exists, and I would again urge the necessity of boiler inspection.

ACCIDENTS.

Eighty-three accidents have been reported and ascertained as having occurred during the year, five of which were fatal. Seventeen have been caused by circular saws, ten by power or drop presses, and four by gear.

One lad, John Carroll, was fatally scalded in a tank of hot water, and died about four hours after the accident. He was seen by a fellow workman sitting on the edge of the tank, dipping his hands alternately into the water to remove the oil from off his hands, work for the day being about ended. His fellow workman went to get a box. He heard a splash ; on looking around he saw the lad's feet projecting above the tank. It is supposed that having one foot on the top step, on which those working at the tank stood, his foot had slipped, causing him to fall into the tank. Only deceased and another fellow workman were in the room at the time. The lad's father complained that he was not notified in time to see his son in life, and not having been informed that his son had been sent to the General Hospital, he ran to the factory at Toronto Junction, only to find that his son had been removed. Doubtless the excitement consequent upon the occurrence of the accident led to the overlook of notifying the parents in time, but the neglect is regretable.

The man John Williams, who died from the effects of inhaling gas, and Charles Catlin, were working as top-fillers at the smelting furnace, their work being to convey the cars containing the ore, etc., from the elevators, on a platform to the top of the furnace. It also being necessary to ascertain the condition of the furnace at certain times by looking through a small opening in the top of it, a plank, was laid across the opening to enable them to do so. Instead of remaining on the plank, as they were ordered to do, Catlin went down on the top of the "charge ;" his head being under the level of the platform ; he was overcome by the gas. Williams, seeing this, went down to Catlin's aid, and managed to lift and place him on the platform, but was himself overcome by the gas. The men on the ground below filling the cars, having noticed that the cars were not being emptied above, gave the alarm, when it was found that Williams had sacrificed his life in saving Catlin's.

In the case of the accident to G. H. Walters, he and another man were working under the sawing floor of the mill, and having finished the work, Walters passed his head to the side of a post for some purpose, presumably to get some tool, evidently forgetting that when the twin circulars were being operated the knuckle joint came against the post where his head was, which it did, killing him instantly.

The accident to Joseph Girouard was a remarkable one, as from the size of the hole in the floor he could only have gone through it on his side, and to save himself all he would have had to do would have been to let go his hold of the cant dog or hand spike. He was what is termed a log roller, rolling the logs on the skids to the band saw carriage, he standing outside the skid. While rolling a log on to the carriage, he put his cant dog on the inside of the skid, and allowed it to project beyond the end of the skid. The band mill sawyer who operates the carriage, started the carriage back further, as he did not think it was far enough back to get the log on the carriage properly. The carriage in

going back caught the cant dog, and deceased holding on to the cant dog, which, acting as a lever, he was tipped over the skid and thrown head first, on his side, into a hole eleven and a quarter inches wide and two feet four inches in length, and went through the tail race out into the river and was drowned. A hole had been made in the floor inside the skid to put the refuse through, although a spout for the purpose of getting rid of the refuse was only distant about eight feet from where the men stand. On enquiry I learned that a man who had been formerly employed at the same work in the mill had made the hole to save himself the trouble of shovelling the refuse into the spout. From the position of the hole and its size, no one to see it would suppose that any such accident could have occurred. The deceased's uncle was operating the saw carriage when the accident occurred, and his brother was within some ten or twelve feet of the hole. It is alleged that the deceased made no effort to save himself.

Ambulance Class.

Having in my last report alluded to aid being given to the injured until medical assistance could be obtained, I have great pleasure in reporting the organization of the first ambulance class in the Dominion in connection with a factory, viz., that of the Messrs. W. & J. G. Greey, mill furnishings, Toronto. Some of the employees of the firm, to the number of twenty-four, including Mr. J. G. Greey, attended the course of six lectures on first aid to the sick and wounded, as adopted by the St. John Ambulance Association. The lectures were given by Dr. C. A. Hodgetts, through whose zeal and lucid manner of imparting instruction nineteen of the number passed the examination and received the certificate of the society, Dr. Nattrass being the examiner.

The greatest interest was taken in the work by Mr. Greey, and to his presence and continued support throughout the course of lectures the success of the class was mainly due. So much was this appreciated by the class that he was subsequently presented with a gold emblem pin of the society.

That the instruction received has been of a practical character has already been evidenced by the several acts of "first aid" rendered by members of the class, and which were given in the annual report of the Toronto Centre.

When speaking of the work done in the Province at the first annual meeting, the President, His Honor the Lieutenant-Governor, referred in words of the highest commendation of the class, and trusted that before long the instruction in "first aid" would be found in most of our factories and workshops, where it is in constant demand.

Having been tendered an invitation to attend the class, I gladly availed myself of the privilege, and can bear testimony to the interest manifested in it by all those connected therewith. I trust that the Lieutenant-Governor's expectations may be realized, in that "first aid" may be found before long in most of our factories and workshops, and more especially in saw mills.

Convention of Factories Inspectors.

The tenth annual convention of the International Association of Factory Inspectors of North America was held in Toronto in the beginning of September last, at which instructive and interesting papers were read and discussed. The conditions of worker

under the sweating system received considerable attention, three papers on the subject having been read. While the sweating system in Ontario has not assumed such large proportions as in the States, yet the conditions here are the same, and as to the pauper price of labor, neither country can afford to throw stones at the other. I would here suggest that the importation of ready-made clothing be prohibited, being, from its liability to infection, a menace to the health of the community.

The delegates all seemed pleased with their reception and treatment, and the Ontario Inspectors endeavored to render their visit as pleasant as possible.

Eleven permits for overtime were granted during the year.

Bake Shops.

At the last session of the Legislative Assembly, the Bake Shops Act was enacted, appointing the inspectors under the Ontario Factories' Act also inspectors under the Bake Shops Act for the purpose of enforcing it. Briefly, the Act provides that all bake shops shall be constructed as to lighting, heating, ventilating and drainage, so as not to be detrimental or injurious to the health of any person working therein, and shall also be kept at all times in a clean and sanitary condition, so as to secure the production and preservation of all the food products thereof in a good and wholesome condition.

That no person shall be allowed to sleep in such bake shop.

That no employer shall knowingly require, permit or suffer any employee in any bake shop to work more than sixty hours in any one week, except by permission of the inspector in writing to the employer.

Also, that no employer shall knowingly require, permit or suffer any person to work in his bake shop who is affected with consumption of the lungs, or with scrofula, or with any venereal disease, or with any communicable skin disease, and every employer is hereby required to maintain himself and his employees in a clean and healthy condition while engaged in the manufacture, handling or sale of such food products.

In the matter of lighting, ventilating and draining, much depends on the situation of the bake shop. If it is situated in the basement of a building artificial light may be necessary during the day. In many places these shops are below the level of the street. Sometimes there is only one window available for light and ventilation, and in cold weather, with it closed, the only method of ventilating the bake shop is through connection with a stove pipe hole in the chimney, or the opening over the oven door, and even if both were in use they would not provide sufficient ventilation, owing to the low roofs, one of which was only about six feet six inches from the floor. Many occupants of underground bake shops have expressed a preference to have them on the ground level, but as they do not own the property and the landlord will not build, they having worked up a trade are necessitated to remain, and more so if they have the premises under a lease.

As regards drains, it would be unjust to require a tenant to provide them, or where they are defective to remedy their defects, unless he were to be reimbursed by the owner of the property. The local boards of health having compulsory powers, can force the

owners to provide the means necessary to keep their property in a sanitary condition. Section 12 of the Bake Shops' Act reads: "Nothing in this Act shall in any way conflict or interfere with the powers and the duties of local boards of health, or the officers appointed under the Public Health Act." In accordance with the foregoing I have notified the medical health officers in cities, or health inspectors in other municipalities, when occasion required.

Having been instructed that the ceilings and walls of bake shops should be lime washed, lime being best adapted for destroying any diseased germs, I have notified occupiers of bake shops accordingly. In the great majority of cases, the requirements have been readily complied with; but there are some dilatory ones who require additional visits and intimations that an introduction to the authorities mentioned in section 11 would result in the event of non-compliance. As copies of the Act have been served on all occupants of bake shops I have visited, I intend to make a return in future of the condition in which I find the bake shops at the time of my visits. I may here state that while some were in a clean, and many in a fair conditon, there were some bake shops that appeared as though they had never been whitewashed since they were built.

In the matter of wash rooms, where only one or two are employed, I have been satisfied with a wash basin being provided, at the closet or at the entrance to the bake shop, so that employees might be enabled to wash their hands before handling the dough or food products. In one large establishment in Toronto, several visits were necessary before a wash basin was provided where required. Some few there are who are indifferent as to conveniences being provided for their employees. One in particular in Toronto, said that he did not know where his employee went, that he never asked him, and did not think it was any of his business to do so. Were more attention paid to supplying clean towels it would be desirable. Flour bags are not desirable as substitutes for towels.

Hours of Labor.

Sixty hours in any one week is the limit to which any employee can be permitted to work in any bake shop. From statements made by bakers, a "go as you please" system prevailed, fifteen hours and over per day being frequently exacted from employees. But since the Act was passed, sixty hours for a week's work has been generally observed, much to the gratification of the men. Two of the worst cases of over working their men I had heard of, were one in Toronto who was fined, and one in Arnprior, who, when I called his attention to the illegality of his working his employees more than sixty hours in a week, complaint having been made to me that such was the case, said he would discharge his bakers and get men who were not bakers, and then he could work them as long as he liked. I notified him that if he worked men in his bake shop more than sixty hours a week I would prosecute him, and notified the local authorities of his threat to contravene the Act. As he also had stated that he was too busy to limewash the bake shop, which needed it badly, I gave him one month to fulfil the requirements—he complied. One of the men in this case told me that when worked such long hours, some fifteen hours per day, he did not feel like keeping himself or the sourroundings clean, and several in the cities, who

had been subject to working long hours have told me the same. If the public desire food products prepared under clean conditions, they would do well to aid in seeing that the sixty hours labor per week in bake shops is not exceeded.

Prosecutions.

There was one prosecution under the Bake Shops Act, Charles Schmidt, of 90 Queen Street West, Toronto, for working, or permitting a man to work, more than sixty hours in the week ending 6th June, 1896. Several complaints having being made to the department that more than sixty hours per week were persistently been worked in his bake shop, I was instructed to investigate, having obtained information that the complaints were well founded. The Crown Attorney prosecuted the case before the Police Magistrate. The evidence showed that the bread bakers in his employ, after they had turned out what in the trade is considered a fair day's work in bread, were required to make a large quantity of cakes as well. Schmidt was fined twenty-five dollars and costs. He discharged the man who corroborated the information I had received, but he obtained immediate work in a shop where men are treated humanely.

Sunday Labor

While the employees do not object to necessary work on Sundays, they do object to working unnecessarily in order to supply hot bread on Monday morning. The employer who keeps the Sabbath is at a disadvantage with him who does not, in that the Sabbath breaker has hot bread earlier on Monday and frequently supplies the other's customers. While in Toronto Sunday work is not so general as in Hamilton and Ottawa, yet there are quite a number who start work on Sunday night. I have been informed that one case was tried in the police court under the Lord's Day Observance Act and a conviction obtained for a contravention thereof, but on a promise that work in the bake shop would not be begun in future, till after twelve o'clock on Sunday night, sentence was suspended.

Having been informed that a lad who was working in a bake shop was afflicted with cancer on the lip, I was instructed to have the employer send him for examination to the Medical Health Officer, who certified that he was not so affected, nor any indication that he had been so. Although I had been informed by two different parties that the lad had stated that he had a cancer on the inside of his lip, his employer was satisfied to retain him in his employ without an examination.

In the eastern portion of the city of Toronto and in the cities of Hamilton, Ottawa, St. Catherines, Belleville and in the town of Peterboro', I have inspected 173 and in the smaller places, 91 bake shops.

	Shops.	In basements under ground level.
In the eastern portion of Toronto	49	33
Hamilton	42	18
Ottawa	34	6
St. Catherines	12	3
Belleville	11	2
Peterboro'	25	6
Smaller places	91	5
Total	264	73

Nearly all the men working in basement shops, to whom I have spoken, have expressed a desire to have the bake shops on the ground level, and it might be well, that

after a specified time, work in underground bake shops should be prohibited. The conditions under which work is performed should be made as pleasant as possible. I have not been able to overtake the work in the outlying districts, but hope to be able to do so when the saw mills are running, which will not necessitate special visits for the bake shops alone.

OVERTIME.

No permit to work overtime has been granted to any baker.

A matter of injustice of which the bakers in business in Ottawa complain is, that the bakers in Hull, just across the river, in the Province of Quebec, where no Bake Shops Act is in force, deliver bread in Ottawa, and as stated there is no law to prevent them doing so. While if an Ottawa baker takes the same privilege in Hull, he is promptly arrested and fined twenty dollars. Evidently a "reciprocity treaty" is needed as between Ontario and Quebec in this matter, or else protection as against the Hull bakers by the enactment of retaliatory legislation.

I have the honor to be, Sir,

Very respectfully,

JAMES R. BROWN,

Inspector of Factories and Bake Shops,

Central District.

TORONTO, 31st January, 1897.

EASTERN DISTRICT.

To the Hon. Mr. Dryden, Minister of Agriculture for Ontario:

SIR,—I beg herewith to submit my report upon the inspection of factories in the Eastern District for the year 1896.

In going over the district which has been given to me this year I found some factories lying outside of manufacturing centers in some obscure corners which had been overlooked to the present time, and which I found out only by chance. I had also to travel some distance in vehicles, and found some of the factories closed up for some time. This would show the necessity of carrying out a suggestion I have made in one of my previous reports, that notice be sent to the inspector of the time of closing factories and resuming work again, so that we would in that way avoid unnecessary travelling.

Amendments to the Factories Act have directed our attention to new matters in the inspection of factories; one was the increased protection as means of escape in case of fire, by providing that ropes be placed at various windows in factories, to be used by employees in case of fire, the number of such ropes to be at the discretion of the inspector as he may order in writing. This, I was somewhat slow in enforcing, owing to the fact that I am convinced that all factories requiring fire-escapes should be so well provided with sufficient ones as to not require these ropes. Again, the putting up of these ropes

might have the tendency of making the employers rely too much upon them and neglect the construction of efficient and reliable escapes. However, orders have been given to all employers, whose factories come under this clause of the Act, to have these ropes put up, in addition to such other escapes as I considered necessary and had required to be built. The only factory where some additional fire-escapes were required was the Stormont Cotton Factory in Cornwall. This was occasioned by an addition to and extension of the work-rooms in the third, fourth and fifth flats, which were already provided with good fire-escapes in the shape of two leading stairways built in towers at opposite sides of the factory, properly separated from the work-rooms by fire proof walls. On my suggestions of the necessity of such additional fire escapes, the manager very willingly promised to attend to the matter, and I am pleased to see that he is negotiating with builders of iron stairs to have one put up at once. I was very much aided, and my efforts in this respect were very much strenghtened, by the co-operation of Mr. Barber, the inspector for the Western District, who accompanied me during the latter part of the month of October.

Machinery and Elevator.

It is gratifying to me to be able to report that in the factories I had previously inspected, considerable attention was paid to my instruction with regard to protection to machinery, and I have no such grounds of complaints as in my previous reports. I have found, however, some elevators in three factories in the new portion of my district which had not as yet been provided with the necessary safety catches as required by the Act. The reason alleged for this was that they were not deemed necessary as the elevator ran only the height of one story and no accidents could possibly occur. The employers, however, promised to attend to this matter without delay. There were also large belts in several places, both in Brockville and Gananoque, running through the floor which had not yet been enclosed. They were considered without danger by the employers as they were not running at a high speed. These belts I have ordered to be fenced in.

I regretted very much to notice that, notwithstanding my advice, very little attention has been paid to the manner in which young girls dress themselves while working in factories, and that they do not seem to understand the great danger and risk they run by wearing loose clothes and long hair. The accident I relate below will show the necessity that exists to give the female inspector some authority to regulate this matter. I have again to repeat that all mills or factories where machinery and power are used should come under the control of the inspector regardless of the number of persons employed. I have had a sad experience of the necessity of the inspection of such places, where I had been informed incidentally of an accident which occurred in a small shingle mill in which the father, his son and a very young daughter were employed cutting shingles for customers bringing the wood to them. The young girl was employed at packing shingles: when walking through the mill, her loose hair caught in a shaft; her scalp was pulled from the top of her head and she was thrown a distance of several feet; she was for several weeks lying in a most dangerous condition. I have taken upon myself to advise the employer to no longer employ in his mill girls or boys under the age fixed by the Act, which he has agreed and promised to comply with.

The means provided to put out fires I have found sufficient in every factory and mill I have visited. This is a matter which is also attended to and very rigidly enforced by the insurance companies, and cannot be neglected by the employers and occupants of any building used as a factory.

Boilers

I have noticed that my report of last year upon the necessity of having boilers placed outside of main building had effect on some employers, and they mostly all admit that the danger of serious accidents from explosion would be greatly diminished by having them placed outside of any work-rooms. In my report of 1892 and subsequent years I had occasion to mention some factories where lives of several employees were exposed in case of explosion of the boilers in the factory. In the Stormont Cotton Factory of Cornwall some eight or nine large boilers were placed in a basement, and some forty-five persons were employed in a room overhead. I was pleased to notice that the manager, having become aware of the danger from various accidents reported, and from my suggestions, had, at a great deal of trouble and expense, removed this danger by placing all the boilers in a separate and isolated building whereby any explosion could affect only the man in charge. I hope that for the safety of all persons employed in factories, and for protection of their lives, this example will be followed by every employer. I am aware that in cities densely populated and where lands are sold at high prices, this argument is used as a reason why boilers are placed in the basement. I hope to see before long that no municipal corporation will allow such death traps in the midst of their population. I have observed that in all cases the men in charge of boilers and engines in all factories in my district have been carefully selected for their experience, ability and temperate habits.

Ventilation and Cleanliness.

I have found the factories generally kept clean; in a few instances in Brockville and Gananoque some improvements could be made in that respect. In these localities several establishments had not separate water closet accommodation for female and male employees and in some instances no water closets were provided; in another instance the only water closet used for men was placed outside, close to the only exit for females working in the factory, to the great inconvenience and annoyance of these females. In all cases, strict orders have been given to comply with the Act, and in every case of neglect I will have recourse to prosecution at my next visit, as these factories have been established long enough to have had time to comply with these requirements.

The ventilation during the summer season is all that can be desired in all factories, but during the winter in several places the windows are all closed for the whole season, and by the excessive heat and the large number of persons employed in some rooms the air is vitiated in a very short time, and the room is ventilated only during the noon hour. The rag-picking room in the Toronto Paper Mill, in Cornwall, where only females are employed, has been inspected by the female inspector, and I am informed she has expressed herself satisfied with the sanitary condition of the room and the suction pipes placed at my request were found sufficient.

CHILD LABOR.

I have not noticed any children under the age fixed by the Act, in any factory in my district this year. All the employers seem to be more careful and particular in this respect. They are now more familiar with the population in the district where their factories are located, so that they cannot so easily be deceived by the parents who too often attempt to place at work their children very young for the purpose of living in idleness and sometimes intemperance.

I must say, however, that I have remarked a large decrease of that evil not only with the class of people I above refer to but also generally.

I have always endeavored to give this question the most careful attention, as I have frequently mentioned in my previous report, and I have observed a large number of children who show signs of having suffered both in their physical constitution and mental faculties by an early confinement in factories, and in some cases by having been subjected to manual labor, especially in saw mills, much above their strength. The amendments made to the Act with respect to the minimum age at which children could be employed will have a tendency to prevent this, and I hope they may be further carried out in the manner I have repeatly mentioned in nearly all my previous reports. This would have the effect not only to improve the condition of the juvenile employees but would also, to a considerable extent, check the competition in the employment of adults and heads of families and young children.

I have had no demand for permits to work overtime from any factory in my district, and none seem to be over-taxed to meet the demands and fill the orders.

Very few accidents have occurred in my district during the year. The following are those reported to me: Three from George Gillies, Carriage Hardware Factory of Gananoque, reported on February 12th, 1896; W. A. Clifford, fell out of car, shoulder bruised; J. Halliday, hit by a wrench, face bruised; W. H. Culvert had his thumb crushed in a wire cutter. One reported by the James Smart Manufacturing Company of Brockville; George Hollingsworth, age sixteen, had the second finger of the right hand taken off at second joint. One was reported in February, 1896 by the D. Jones Manufacturing Company of Gananoque; R. J. James a boy had his arm crushed in a large cog-wheel of a shovel handle pressing machine; the arm was amputated in the Kingston Hospital. One was reported on the 12th October, 1896, by the James Smart Manufacturing Company of Brockville; a boy named L. Row had the first finger of the right hand bruised in a power pressing machine.

All of which is respectfully submitted

O. A. ROCQUE,
Inspector for the Eastern District.

REPORT OF FEMALE INSPECTOR OF FACTORIES.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to submit the following report of factories inspection for the Province of Ontario for the year 1896:

During that time I have inspected 986 establishments that come under the operations of the Ontario Factories' Act To many of these I have made repeated visits. There are some places which demand close and frequent inspection. I consider that I have covered the entire ground in which my duty lies.

I have made many recommendations of various sorts. Some have been made verbally, others have been directed by writing In most cases compliance has been cheerfully granted.

I am pleased to be in a position to report a marked improvement in general surroundings of workshops where females are employed.

Factory laws are for mutual benefit and protection of both manufacturing and laboring classes. A very pleasant feature of factory inspection is its double nature. It is very pleasant to receive a cordial greeting from the members of the firm, and at the same time pleasant smiles from the faithful employees, who in us, recognize friends looking after their safety and interest.

Life in the factory is secluded from public view. The gates of the mill open for the entrance of certain people, and for these alone. It is an accepted fact that a measure of publicity in the transaction of affairs is salutary, whether for nations, corporations or individuals.

There is a wide contrast between the best conditions of factory life and the worst. The best cannot be reached in all cases, but where there is an effort toward, and a spirit of improvement, we must be satisfied to procure the needed alterations one by one.

The inspection of small places is very important. Sanitary and safety precautions are likely to be disregarded in such places. As a rule, the larger factories have better sanitary conditions, more safeguards, and better conveniences of all kinds for those employed.

Frequently, in my round of duty, I come across a miserable place lacking in everything to make a work-room desirable, but can do nothing to better the conditions because there is not the requisite number employed therein.

Trade has been in a depressed condition in almost every industry during the year. Many of the factories were found working on short time, others were operating with reduced forces. The existence of this state of affairs has developed many opinions as to the cause. Both the wise and the unwise have been trying to solve the problem.

COMPLAINTS.

I have received a number of complaints, some of which have been regarding the condition of work-rooms which were cold and draughty, and where the girls had to remain in their wet clothing without fire. One pleasant result of communication between workers and inspectors is that when complaints have been pronounced by the inspector,

af er investigation, to be insufficiently grounded or outside the scope of our power, the decision has been loyally accepted by the workers. This goes to show that much dissatisfaction, as well as many real causes of grievance, can be happily removed by development of personal relations between inspectors and workers.

Child Labor.

I have found but little child labor employed, and upon the proprietor's attention being called to the matter I have had no difficulty in having the children under fourteen years of age removed from the factory.

Some parents or guardians, devoid of conscientious scruples, teach their children to falsify as to their ages. Thus equipped with falsehood, they are sent out into the world to seek employment. I think the school teacher's disinterested certificate would be more reliable than that of parents.

There is one thing that must tend to raise the physical and moral standing of our women, that is the wise law which has put an end to the employment of young children in mills and workshops. So strictly is the law enforced in this matter, and so careful the inspection, that many employers have stated that they find the employing of children undesirable.

Whatever tends to keep our children for a longer period at school, more under direct parental control, and away from the harmful physical and moral influence of early labor, must one day result in an improved condition of the industrial classes.

We are a nation of money-getters. Every means that can be invented is adopted among all classes and conditions of life. We find this the predominating ambition of men.

At what age should children enter this arena is a question. There never was a time when child labor could be so well spared as now. We need not legislation but an intelligent public opinion to make our laws effective. We need that every working man may see the evil of sending his children into the factory or workshop, whether he does it by evasion of the law or by full legal right. While children are employed grown people will be idle, and so the support of the family will fall on its weaker members. Thus the employment of children tends to the lowering of wages, the fixing of idle habits, and the breaking up of proper family relations.

Sanitary.

The older mills and workshops are lacking in the conveniences which are found in the more modern ones. They would require many changes to be equal in any particular. These changes have to be pursued under great difficulties in old and dilapidated factories, or large private houses, which have been turned into workshops ill-adapted to the purpose. In the "rag-sorting" workshops, I find a number of changes have been made. Some have moved into new buildings with good sanitary arrangements, others have complied with the law as far as possible where they are, but there is vast room for improvement yet. In those rooms in which old clothes, old carpets contaminated with filth, dirt and disease, are torn in shreds for use in the shoddy mills, the place is filled with stifling dust and dirt which are dangerous to the workers.

Lavatory.

The employees too often fail to second the efforts of the employers. After the proper conveniences have been provided, with lavatory, wash basins, soap and towels, and in many cases hot and cold water, I find the place in a dirty condition, owing to the indifference of many of the operators themselves, and it requires a constant watch to see that they are kept clean.

Abstract.

I have had a copy of abstract, with my address, posted in every factory and workshop where persons are employed who are affected by the provisions of the Act.

Hours of Labor.

Though there is little work which requires great muscular strength or exertion in our factories, yet the alertness and exactness of attention and constant application required exhaust the nervous vitality very rapidly. Most of the operators are necessarily on their feet nearly all the time, and this fact has an unfavorable effect upon the health of women and girls. I trust it will not be long before employers can see their way to make a general half-holiday. I think there is no room for doubt as to the necessity of such a change, and I feel certain that the results would be gratifying to both employer and employees.

The present system of working sixty hours per week necessitates the remaining at work until late on Saturday evening. Some factories try to cut short the noon-day meal hour in order that they may shorten Saturday's working hours at the expense of the meal hour of every day in the week. The legal Saturday half-holiday would be hailed as a blessing, and would, in a very short time, become as popular with employers as it would be with employees.

Overtime.

I consider the "overtime" system should be discouraged in all trades, even, when extra work means extra pay, and there are some factories who have worked overtime without paying extra.

Overtime is felt to be a hardship among most workers, and it is next to impossible to define the number of hours worked per day when that number is being systematically exceeded. It is responsible for some of the idleness or only partial employment of a small number. It fosters a spirit of discontent in those who do not get the work. Irregularity of employment is its inevitable result, and I am confident that much good would result from the reduction of occasions in which overtime may be worked, and also from the prohibition of it for young persons.

In connection with the special risks to which girls and women are exposed, in use of machinery or working in proximity to moving machinery, I may say that I have taken every suitable opportunity of urging and encouraging females to dress their hair and wear clothes in a way likely to reduce the risks of accidents.

Steam Laundries.

Section 6, sub-section 3, of The Factories' Act, says it shall not be lawful for any young girl or woman to be employed for more than ten hours in any one day, nor more than sixty hours in any one week, unless a different apportionment of the hours of labor per day has been made for the sole purpose of giving a shorter day's work on Saturday. The law is, that the period of employment may not exceed a certain number of hours. It is hard to avoid overtime as long as they have the power of daily altering the period of employment. It is difficult, indeed almost impossible, to prove the actual number of hours any one person has worked. As it is now, they can begin work at say nine o'clock in the morning, work till twelve, noon, stop one hour for lunch, commencing at one o'clock and work to 7.30 or 8 o'clock, thus making six and a-half or seven hours without refreshments. This, I consider, is injurious to the health of young persons and women.

Again, some laundries do not begin work on Mondays till one o'clock; then they will try to make sixty hours in five and a half days; or, worse still, when a public holiday comes, they will even try to make that up in five days.

Further, one-half of the help are young girls from fifteen to eighteen years of age. In hand laundries the proportion of young persons is much less. They have neither the skill nor the strength to do hand-work, but they can be set at once to put plain things between the rollers of the machines. They stand the whole day, and the manual labor is very often arduous. They suffer in many ways, which seem chiefly traceable to over-exertion of the body. It is not only the length of the hours worked which is productive of so much harm, but the fact, especially in the winter time, that those hours are passed in an atmosphere vitiated by gas and other impurities, which have continued to accumulate during the whole day, and the workers then inhale it at a time when the body is fatigued by a full day's work.

Contract Making of Clothing.

I have given a good deal of attention to this line of business. Generally speaking the sanitary accommodations in those places are dirty and neglected. The gas stoves used for the purpose of heating the pressing irons I find in many of those work rooms very offensive, owing to the noxious fumes.

There has been some degree of overcrowding in some of those workshops, but I find that there has been considerable—and I may say successful—effort on the part of the employers to provide additional workroom accommodation for their hands.

One difficulty which we have regarding those places is, they are constantly moving from place to place, while new ones are frequently springing up, the consequence being that they are lost sight of for some time.

The system commenced through competition, and it has been suffering from the same cause. The contractor began by reducing the profits of ordinary tradesmen and by lowering the price of labor, and their number increases every year. One contractor makes war upon the others, and the demand for cheapness is not satisfied.

It has been told me by a contractor that they are compelled to accept the prices offered by the wholesalers; if they did not take it some one else would, thus bearing out the statement that competition and rivalry of the contractors are the principal cause of reduction.

There is another feature and that is the injustice done the manufacturers who pay liberally for good work done in their own workshops, and who are complying with the law in every particular, and who are obliged to face a competition so sharp and ruinous.

I rarely visit one of these workshops where some irregularity is being carried on without being informed that so and-so is a much greater sinner.

The closing of everyone of those workshops would not throw a solitary person out of employment. It would simply drive them from the wretched places in which they now labor into well regulated factories and workshops.

Ventilation.

Ventilation is always a difficult question. The highest authorities differ as to the best methods, and what is a good system in one room or building will fail in another. There is one point evident, but which I find the least understood, that whereas ventilation is good, draughts are bad.

How often the ready reply to suggested ventilation, "Oh, they can open the windows," forgetting that in winter an open window means draught and chill, and all the attendant risks.

The question of ventilation is not an easy one, and I frequently find, after having secured improved conditions, the very people for whose benefit the change had been made had rendered it partially useless or altogether inoperative. I find in many of those places every air-inlet choked, as, through fear of draughts and colds, the workers seem prejudiced against a flow of fresh air into their rooms. Many complaints to the effect that the atmosphere is neither agreeable, comfortable nor healthful in numerous lines of industries are by no means without foundation Lack of ventilation is one of the most dangerous elements in factory life. Impure air and impure water are the two great roadways of disease.

In view of the little exercise women and young girls as operators have in our factories, they are an easy prey for any disease, and it is necessary that the atmosphere that they breathe should be kept as pure as possible. The better the condition of the working people the better the production.

A very large percentage of our factory girls are beautiful types of Christian devotion and fine womanly feeling. I am sure you will find as large a number of generous self-sacrificing sisters and daughters among mill help as among any other class in the world. There is honor in every right walk of industry, whether it is weaving fabrics or selling the product behind the counter. Labor contributes to the public welfare; it is therefore worthy of public care.

I am pleased to acknowledge the assistance given me by local medical health officers and their voluntary reports on the action taken in consequence of our complaints notified

to them. The aid thus given has been appreciated, and as this co-operation becomes universal and brings us into still closer communication with the sanitary authorities, it will enable us to achieve more work in a given time.

Prosecution.

During the year I have had but one case where I have been compelled to prosecute for violation of the law for keeping females more than sixty hours in one week, this case being Mr. E. M. Moffatt, manager of the Parisian Steam Laundry, 67 Adelaide street west, Toronto. He pleaded guilty, paid fine and costs. As the law becomes better understood the work will become less difficult.

The work of an inspector is not, as many suppose, confined to the visits made at the factory. This report will disclose only a partial and inadequate view of the actual work performed. It is not at all an uncommon thing to visit the factory several times for one reported inspection, and in case of accidents you visit the factory in which the accident occurred, the injured person either at home or at a hospital, or wherever they may have been taken. All those visits require a great deal of time, tact and patience.

In order to secure success we should keep well informed in all that is transpiring around us.

I have the honor to be,
Yours respectfully,

MARGARET CARLYLE,
Inspector of Factories.

Toronto, January 31st, 1897.

No.	Date.	Employer.	Place.	Name of person injured.	Age.	Particulars.
					years.	
1	January 8	H. A. Lozier & Co	Toronto Junc	*John Carroll	18	Scalded in tank of hot water. Slipped while sitting on edge of tank. Died about four hours after the accident.
2	April 9	Hamilton Iron and Steel Co	Hamilton	*John Williams		Died from effects of gas from smelting furnace.
3	June 5	Gilmour & Co	Trenton	*Louis Defoe		A moulding strip went back over the top of circular saw, and struck him in the region of the heart. Died about half an hour after the accident.
4	" 8	Gillies Bros	Braeside	*G. H. Walters		Head caught between post and knuckle joint of twin circular saws; instantly killed.
5	October 28	J. R. Booth	Ottawa	*Joseph Girouard	23	While holding on to cant dog, which projected beyond the log skid, saw carriage caught the cant dog and he was tipped over the skid and thrown head first into a hole 11½ inches wide by 2 feet 4 inches in length, into the tail race and carried out into the river. The body was not recovered.
6	January 8	R. & T. Watson	Toronto	Burt Davey	16	Lost middle finger and joint of second finger of left hand in rolls of candy machine.
7	" 25	Trent Valley Woollen Co	Campbellford	Walter Fogg	18	Point of finger taken off in gear.
8	" 30	H. A. Lozier & Co	Toronto Junc	W. J. Middleton	17	Top of second finger of left hand cut off in power press.
9	February 15	Canada Gen'l Electric Co	Peterboro'	S. Taylor	16	Little finger, right hand, taken off at third joint in milling machine.
10	" 18	St. Lawrence Foundry Co	Toronto	John Ablitt	45	While hoisting some machines, rope broke, leg jammed.
11	" 21	Peter Hamilton Mfg. Co	Peterboro'	William Anderson	38	Part of two fingers of right hand cut off on buzz planer.
12	" 25	W. W. Chown & Co	Belleville	Ernest H. Minns	17	Tops of three fingers taken off above the nail on left hand, in power press.
13	" 26	R. Campbell	Hamilton	S. W. Beale		Right hand amputated at wrist; caught between two rolls.
14	" 28	St. Lawrence Starch Co	Port Credit	Henry Wilcox	41	Thumb, right hand, amputated; caught in crank of engine.
15	March 2	Canada Screen Co	Hamilton	George Phillips	26	Four fingers, left hand, cut off; caught between cam and slide of eye bender machine
16	" 19	Hamilton Cotton Co	"	Victor Taylor	15	Arm broken; caught in a belt.
17	" 19	H. A. Lozier & Co	Toronto Junc	John Schultz	38	Large bone of left arm broken by fall from a ladder.
18	" 21	Welland Vale Mfg. Co	St. Catharines	George Gunn	19	Left arm amputated above elbow in gear while cleaning machine in motion.
19	" 27	J. R. Booth	Ottawa	Cleophas Charron	28	Leg broken at ankle; caught in belt. Leg amputated between knee and ankle.
20	April 7	Kemp Mfg. Co	Toronto	Edward Saunders	21	Middle finger of right hand cut off at second joint in stamping press.
21	" 9	Hamilton Iron and Steel Co	Hamilton	Charles Catlin		Overcome by gas from smelting furnace; confined to bed for a time.
22	" 16	" "	"	A. Faulkner		Foot burned by hot iron getting into his shoe.
23	" 23	H. A. Lozier & Co	Toronto Junc	Henry McMahon	27	Head singed slightly; overflow of gasoline.

24	" 29	Office Specialty Mfg. Co	Newmarket	Andrew A. Gilmour	29	Flesh cut off the side of third and fourth fingers of left hand, on shaper; fingers all saved.
25	" 30	W. & J. G. Greey	Toronto	William Ewing		First finger of left hand taken off on iron planing machine.
26	May 2	Norton Mfg. Co	Hamilton	Harry McEwen	17	Point (¼ inch) of middle finger of right hand cut off in power press.
27	" 12	Messrs. Reid & Brown	Toronto	Charles Randall	18	Left foot slightly burned with molten iron.
28	" 19	W. & J. G. Greey	"	Alexander Brown	27	Legs and one foot bruised, back also wrenched, by iron rolls falling on him.
29	" 18	Canada Lumber Co	Carleton Place	James Greig		Lost one finger of left hand on saw.
30	" 18	Norton Mfg. Co	Hamilton	Charles Grotz		Set screw caught shirt sleeve, drawn around shaft; right arm fractured in three places.
31	" 20	H. A. Lozier & Co	Toronto Junc	Frank Stolte	26	Arm slightly burned by fire in enamelling room.
32	June 1	J. R. Booth	Ottawa	John Albert	60	Both wrists broken by falling off a bridge in lumber yard.
33	" 5	Norton Mfg. Co	Hamilton	Fred. Scott	18	Index finger of left hand cut off at first joint in power press.
34	" 5	" "	"	J. Frazer	21	Top of index finger of right hand crushed in bumping press.
35	"	J. R. Booth	Ottawa	Joseph Guay		Index finger cut on a circular saw (he kept at work).
36	" 17	H. A. Lozier & Co	Toronto Junc	James Doyle	37	Slightly burned by sand blowing out of a heated pipe.
37	" 18	William Morrison	Lambton Mills	Swanson Morrison		Right arm caught in belt; broken in two places.
38	" 22	H. A. Lozier & Co	Toronto Junc	William Chapman	24	Middle finger lacerated; caught in machinery.
39	" 23	Donald M. Fraser	Almonte	William James Ryan	15	Left arm lacerated from wrist to elbow on carding machine.
40	" 21	The Riordan Paper Mills	Merritton	Henry Rogers	40	Wrist lacerated by pushing hand between drying cylinder and belt.
41	" 29	Rathbun Co	Deseronto	Rupert Green	16	Piece taken out of hand by being caught in heading chain.
42	" 30	Gilmour & Co	Trenton	Thomas O'Hara	10	Hip joint hurt by circular saw driving table against him.
43	" 30	Dom. Art Wood Work Co	Toronto Junc	Henry Laurence	50	Little finger of right hand cut off on circular saw.
44	July 2	Merriton Cotton Co	Merritton	Mrs. Dehate	53	Right foot hurt by piece of iron falling on chair placed on her foot.
45	" 6	Gilmour & Co	Trenton	Henry Jacobs	70	Arm badly cut at elbow by falling against butting saw.
46	" 10	W. C. Edwards & Co	Ottawa	William Heath	25	Thumb of right hand cut on foot mitre machine.
47	" 11	St. Lawrence Foundry Co	Toronto	William Spencer	37	Top of fourth finger, left hand, amputated in cogs of crane.
48	" 21	Norton Mfg. Co	Hamilton	James O'Connor	17	Large toe of right foot severely bruised, in contact with ending machine.
49	" 24	Rathbun Co	Deseronto	Fred. Lloyd	18	Hand bruised and cut while oiling machinery.
50	" 29	Dom. Art Wood Working Co	Toronto Junc	William Stewart	18	Second finger of right hand cut off on circular saw.
51	" 30	Rathbun Co	Deseronto	E. H. Waggar	15	Flesh wound on side of leg, cut with edge of pulley.
52	" 30	Office Specialty Mfg. Co	Newmarket	James Dolan	19	Second finger of left hand cut off on finishing jointer.
53	August 10	Capital Planing Mill Co	Ottawa	George J. Walker		Thumb of left hand cut off on circular saw.
54	" 11	Globe File Mfg. Co	Port Hope	William Trawin	20	Third finger of right hand cut off at nail by bundle of steel falling.
55	" 22	Rathbun Co	Deseronto	William Butler	18	Second finger taken off below first joint on hand cutting machine.
56	" 26	St. Anthony Lumber Co	Whitney	Edward Vanblaricum		One toe of left foot taken off and foot mashed in log loader.
57		Gilmour & Co	Canoe Lake	David Dickey		Arm and two ribs broken; while fixing steam feed a man started carriage.
58	September 8	Messrs. J. B. Smith & Son	Callendar	James McCreight		Knocked down and wrist broken by shovel thrown from circular saw.
59	" 16	Spanish River Lumber Co	Spanish River	Daniel Cataract	41	Right hand cut; stumbled against circular saw.
60	" 18	St. Catharines Box & Basket Co.	St. Catharines	Wesley Monday		Right thumb cut off on re-saw.

*Fatal.

ACCIDENT REPORT.—CENTRAL DISTRICT, 1896.—*Continued.*

No.	Date.	Employer.	Place.	Name of person injured.	Age.	Particulars.
					years.	
61	September 21...	Firstbrook Bros	Toronto	William Norman Atkin.	14	Fingers of hand cut across back; contact with circular saw; larking with another boy.
62	" 22...	Rathbun Co.....	Deseronto	Milton Hurst	37	Thumb and forefinger lacerated on circular saw.
63	October 2.....	Dom. Art Wood Working Co ...	Toronto Junc ..	George Harris...	38	Two fingers of left hand cut off on buzz planer.
64	" 8.....	Hamilton Blast Furnace Co	Hamilton	Walter England..... .	30	Foot injured by blow pipe falling on it.
65	" 8.....	Ontario Cotton Mill Co	"	Louis Lavois	15	Chest badly bruised; caught between mule carriage and roller beam.
66	" 10.....	The Dixon Co	Peterboro'.....	Albert Walter Spencely.	14	Four fingers of left hand cut off on shingle jointing (circular) saw.
67	" 13	Merritton Cotton Mill Co	Merritton	John Raycroft	15	Cut on right cheek; caught between mule carriage and roller beam.
68	" 23.....	John Taylor & Co.....	Toronto	Clement A. Budd	.....	Middle finger of left hand cut off in power press.
69	" 26.....	Globe File Mfg. Co	Port Hope.	Joseph Richards.....	24	Left arm cut between wrist and elbow; chisel flew out of rotary disc.
70	" 29.....	Office Specialty Mfg. Co	Newmarket . ..	Robert Allen	18	Four fingers of right hand cut off at second joint on shaper.
71	November 4....	Capital Planing Mill Co	Ottawa	Felix Terrican.....	34	Lost part of second finger of right hand.
72	" 5....	Kemp Mfg. Co	Toronto	Edward Reid	21	Four fingers and part of left hand cut off on power press.
73	" 9....	Merritton Cotton Mill Co	Merritton	Jennie Hurson	15	Broke both bones of left fore arm; fell while running in mill.
74	" 10....	Markham Woollen Mill Co.....	Markham	Frank Ryan.....	16	Head bruised; caught between mule carriage and frame.
75	" 11....	Merritton Cotton Mill Co	Merritton	John J. Dundas	14	End of third finger, right hand, cut off in gear of hand power banding machine.
76	" 13....	H. A. Lozier & Co.	Toronto Junc ..	John Wear	16	Top of first finger, left hand, cut off in power press.
77	" 16....	Office Specialty Mfg. Co	Newmarket	Earl O'Brien	15	Second and third fingers cut off above first joint, and points of first and fourth fingers of right hand cut off in power press.
78	" 19.. .	H. A. Lozier & Co.....	Toronto Junc ..	John Calder.....	24	Thumb of right hand crushed slightly between ram and vice of shaper.
79	" 24....	Firstbrook Bros	Toronto	Bertie Coysh	15	Cut on hand, on cross-cut saw: three or four stitches put in.
80	December 2....	Rathbun Co.....	Deseronto	Dan. Chase	45	Piece of two fingers cut off on circular saw.
81	" 3....	Hamilton Blast Furnace Co	Hamilton	James Matthews	40	Leg broken by piece of frozen ore from top of pile striking him on the leg.
82	" 5....	" " "	"	Martin Gillum.....	30	Suffering from concussion of the brain; fell from elevated track in stock-house.
83	" 5....	W. C Edwards & Co., Ltd ...	New Edinburgh.	George Robinson	28	End of thumb of right hand cut off on band saw.
84	" 14....	Rathbun Co	Deseronto	W. J. Baker	35	Index and middle finger of left hand lacerated on circular saw.

ACCIDENTS REPORTED IN 1896.—WESTERN DISTRICT.

No.	Date.	Employer.	Place.	Business.	Person injured.	Age.	Particulars.
1	January 3	The R. Forbes Co. (Ltd)	Hespeler	Woollens	Maggie Slater	23	Thumb pierced by gill box, not serious.
2	" 6	Anderson Furniture Co. (Ltd)	Woodstock	Furniture	Patrick Lavin		Finger tip cut off by buzz planer.
3	February 17	" "	"	"	J. Castlor	15	Finger off each hand; playing with a string, which caught in a turning lathe.
4	April 10	" "	"	"	Wm. McAffee	23	Arm, flesh wound from a dado machine.
5	July 13	" "	"	"	J. McGachan	45	Leg broken; fell from an elevated lumber track. Car off the track, wheel came off and fell on his leg, breaking it.
6	September 29	" "	"	"	John Black	15	Finger crushed in a sanding machine.
7	" 30.	" "	"	"	Jos. Quick	19	Thumb and finger severed; also a severe cut on hand by a seat framing machine.
8	November 19	" "	"	"	R. Cole	16	Thumb and three fingers cut by rip saw; fooling with it.
9	December 11	" "	"	"	Wm. Lanaway	21	Thumb and fingers of left hand cut off by rip saw.
10	January 10	A. R. Woodyatt & Co	Guelph	Lawn mowers	Wm. Sturdy		Body burned by molten iron, by putting wet scrap in overheated iron to cool it.
11	July	" "	"	"	Geo. Johnston	22	Left foot and leg burned by molten iron.
12	January 13	D. Maxwell & Son	St. Mary's	Reapers	Thos. Tremble		Fore finger and thumb cut off by sticker.
13	" 25	McClary Mfg. Co (Ltd)	London	Stoves, tins, etc.	Louis Ouimette	16	Leg scalded by stepping into a kettle in which a solution of soda was boiling.
14	" 16	" "	"	"	Bert Woodward	18	Thumb tip cut off by cutting press.
15	July 18	" "	"	"	Wm. Finch	16	Thumb crushed by cutting press.
16	October 3	" "	"	"	Ed. Miller	17	Finger crushed by grooving press.
17	January 8	Farmers' Binder Twine Co	Brantford	Twine	Woman		Injured by breaking of bobbin on a fly-frame.
18	" 31	McPherson, Hovey & Co	Clinton	Agrl. implements	Wm. Muir		Three fingers of left hand cut off by a buzz planer. He had just removed guard off gap.
19	February 4	Langmuir Mfg. Co. (Ltd)	Toronto	Trunks, etc.	W. G. Clark		Two fingers taken off in cog wheels of matching machine; since guarded.
20	" 1	The Wortman & Ward Mfg. Co.	London	Churns, etc.	Daniel McKay	18	Fingers cut off while oiling sticker.
21	February 4	Newlands & Co	Galt	Knitting	*Russell Kitchen	23	Engineer; clothing wound around overhead shaft; inquest shows he went up to the shaft contrary to orders.
22	February	The Gold Bicycle Co (Ltd)	Brantford	Bicycles	Wm. McCurdy	26	Finger taken off in a press; was cleaning and another person tipped the press.
23	March 2	" "	"	"	Boy		Foot squeezed in the elevator.
24	February 8	The Globe Furniture Co (Ltd)	Walkerville	Furniture	Matthew Beasley		Fingers of left hand, one at first joint and one lacerated by grooving saw.

*Fatal.

ACCIDENTS REPORTED IN 1896.—WESTERN DISTRICT.—*Continued.*

No.	Date.	Employer.	Place.	Business.	Person injured.	Age.	Particulars.
25	January 3.....	The Slingsby Mfg. Co. (Ltd)....	Brantford	Blankets	Mrs. Rowley	.....	Collar bone broken ; dress caught in a belt while scrubbing.
26	February 19....	The Penman Mfg. Co. (Ltd)	Thorold	Knitting	Boy—Shuman	.....	Fingers to first joint torn in gears of card ; was cleaning in motion.
27	March 10.....	The Brantford Carriage Co	Brantford	Carriages.....	Geo. Miller.....	.....	Finger of left hand caught in planer.
28	" 6.....	Guelph-Norway Iron & Steel Co.	Guelph.....	Bar iron	J. Cook	.....	Shoulder dislocated, fell into the ash pit of heating furnace.
29	" 9.....	Windsor Salt Works	Windsor	Salt.....	John Hogel	.....	Great toe smashed by bridge tree of tower falling on it ; amputated.
30	" 20.....	Wm. Gray & Sons.....	Chatham	Carriages.	Hugh McLean	.....	Two fingers of right hand badly hurt ; jammed in disc-sander.
31	" 11.....	Verity Plow Co	Brantford	Agrl. implements	Thos. Heaman	35	Third finger of right hand smashed ; drop hammer fell on it while cutting dies ; another workman accidentally tripped it
32	" 12.....	" "	"	" " .	Wm. Hamlin..	30	Hand and fingers smashed by drop hammer. The hook-up pin became detached, allowing hammer to drop.
33	" 13.....	The Bertram Eng Wks. Co. (Ltd)	Toronto	Engines, etc....	Fred. Edgar	18	Fingers lost to first joint ; jammed between sling and beam.
34	" 25.....	" "	"	" "	*Robt. Bothwell	32	Fatal. Crank stem of crane broke while four men were lowering a heavy flask. He was struck on head by stem of crank.
35	April 18.....	" "	"	" "	Thos. Lanigan	14	Two ribs and left arm broken. Missed his footing and fell into hull of iron steamer in construction.
36	June 16.	" "	"	" "	Man	.....	Arm burned by the explosion of a lamp in hull of above steamer.
37	July 2.	" "	"	" "	John Laurie	.....	Fell down ladder in ship yard, breaking small bones of his right foot.
38	January 27.....	Geo. Rathbone	"	Planing	Man	... .	Hand slightly cut by shaper.
39	April 6	T. Waterhouse	Palmerston...	Woollens.....	*E. C. Munsen	.....	This boy is supposed to have been caught in the engine fly wheel.
40	March 18	H. E. Palmerston	Charlotteville	Lumber	*Louis Cole	25	Killed — Boiler exploded.
41	" 18.	" "	"	"	Michael Aspden.....	40	Head and arm scalded — Head of boiler flew out. Cause, flaw in boiler.
42	" 18.....	" "	" .	"	Norman Weaver	48	Ankle broken
43	April 11.....	Steinhoff & Gordon.....	Wallaceburg .	Staves	Marshall Benn	.....	Thumb end cut off by hoop machine. Idle six weeks.
44	May 6. ...	" "	" .	"	Alex. Stewart	.. ..	Back cut by falling against equalizing saw.

45	April	6	Watson Bros	Ridgetown	Staves, etc	*David Leitch	54	Killed, engineer (Boiler exploded, demolishing the mill. This occurred about 7 a.m. W. J. Watson was a partner.
46	"	6	" "	"	" "	*Wm. Cunningham	17	Killed
47	"	6	" "	"	" "	*J. T. Butler	42	Fatal, died next day
48	"	6	" "	"	" "	*W. J. Watson	....	Fatal, died 6 days after
49	"	6	" "	"	" "	Wm. Newcomb	....	Arm and 3 ribs broken
50	May	8	Dominion Cotton Mills Co. (Ltd)	Brantford	Cottons	*Robt. Sweeting	23	Killed. Was standing on a ladder holding belt off shaft above while being tightened. Belt caught; he was whirled around shaft three or four times; both legs torn off at the knees, both arms at the sockets.
51	"	19	Warrer, Toby & Co	Collingwood	Leather	*John McKinley	54	Killed. Clothing caught on counter-shaft. He had no business near the shaft.
52	"	29	Burr Bros	Guelph	Furniture	*Thos. Hurley	....	Fatal. Putting on a belt with a stick, which slipped, and was struck by the arm of another pulley and forced down against his abdomen, causing injuries which resulted in death.
53	June	2	Goold, Shapley & Muir Co. (Ltd)	Brantford	Machinery, etc.	J. H. Rodes	....	Two finger ends cut off by jointer.
54	....	....	Ferguson & Pattinson	Preston	Woollens	Wm. Edgar	....	Two finger ends severally injured in gears of wool picker. Was removing some wool while in motion.
55	June	12	The S. Hadley Lumber Co. (Ltd)	Chatham	Planing	Jas Gemmil	....	First and third fingers of left hand cut off by jointer.
56	"	16	John B. Snider	Waterloo	Furniture	Geo. Teuffel	....	Thumb cut by circular saw.
57	July	11	" "	"	"	" "	....	Hand badly cut by a jointer.
58	June	18	Freeman Box and Basket Co.	Freeman	Baskets	—— Galbraith	22	Tips of two fingers cut off by slicer.
59	March	7	Norwich Broom Factory	Norwich	Brooms	Jos. Bowman	....	Finger of left hand cut by scraper—foot power.
60	July	2	Hanover Furniture Co.	Hanover	Furniture	Hy. Herman	.	Part of finger cut off by rip saw.
61	February	20	Zinkan & Bowman	Southampton	Leather	A. Boddy	18	Chest injured. Coat caught in cogs of bark cutter. Idle three months.
62	July	10	R. Truax & Co	Walkerton	Planing	Hy. Geister	....	Two fingers injured. One off at first joint and one had skin torn off by shaper.
63	"	11	" "	"	"	Christie Morrison	.	Ankle badly sprained by stepping on the edge of loose plank.
64	"	22	The Guelph W'l'n Mills Co. (Ltd)	Guelph	Woollens	Ann Pimbleton	....	Third and fourth fingers caught in cogs. Amputated.
65	"	....	Roschman Bros	Waterloo	Buttons	Hy. Henrick	17	Fourth finger of left hand injured. Whole sinew was pulled out and left hanging. Caught in string over revolving shaft.
66	"	21	Toronto Radiator Co. (Ltd)	Toronto	Radiators	W. Davis	....	Finger end cut off by a power press.
67	"	26	The Knetchtel Furniture Co. (Ltd)	Hanover	Furniture	Otins Jehildinger	....	Burnt by shavings in bin in the boiler room taking fire.
68	December	22	"	"	"	Abram. Geitman	18	Left leg cut and bruised by a sand drum getting out of order.
69	"	23	"	"	"	H. Privat	32	Three fingers of right hand cut off at root of nails by buzz planer.

*Fatal.

ACCIDENTS REPORTED IN 1896.—WESTERN DISTRICT.—*Concluded.*

No.	Date	Employer.	Place.	Business.	Person injured.	Age.	Particulars.
70	July 31.	S. Beaumont	Glen Williams	Woollens.....	B. Currie	.....	Arm broken and body injured. Caught on a belt and carried around the shaft.
71	September 8...	W. Boulter & Sons	Toronto	Canned goods ..	D. Humphries	.....	Hand and arm hurt by hand crane.
72	" 11...	C. E. Naylor	Essex	Staves	*Elijah Wisner	.....	Cut from hip to shoulder by equalizing saw. Carelessness is reported.
73	" 16...	Pettit Bros	Near Comber.	"	*Alf. Jacobs.....	24	Killed. Boiler exploded, killing him instantly.
74	" 19...	Roden Bros	Toronto	Silverware	Ed. Coleman	....	Fore finger of left hand crushed in press.
75	" 29...	Sutherland, Innes & Co. (Ltd)...	Romney.....	Staves	Wm. Bettridge.....	.....	Ankle broken and scalp wound. Caught in a belt.
76	" 10...	Preston Furniture Co	Preston	Furniture	*Arthur Knapp	....	Struck by a stick thrown from a saw. Died in three or four days after.
77	" 16. .	H. Krug	Berlin.....	Parlor frames ..	Peter Scott	.....	Thumb cut to the bone by a rip saw.
78	October 23.....	Watson & Malcolm	Kincardine ..	Furniture	Harry Anning	16	Left arm cut off three inches below shoulder by large planer.
79	June 26.....	Toronto Electrical Co.....	Toronto	.....	J. E. Thomson	45	Finger hurt in a lathe.
80	October 28.....	Waterloo Mfg. Co. (Ltd)	Waterloo.....	Agrl. implements	Roland Hachburn	18	Two fingers crushed in lathe, cleaning in motion.
81	December 7....	" "	"	" " .	John Cation	.....	Finger broken, drilling angle iron.
82	October 28.....	Massey-Harris Co (Ltd).....	Brantford	Reapers.....	Harry Phipps	....	Eye injured by chip from die of punch.
83	November 9....	" "	Toronto	Bicycles.....	R. Williams	.....	Face injured by bursting of emery wheel.
84	" 4....	Kensington Furniture Co. (Ltd).	Goderich	Furniture	Lester Curnell	34	Finger and thumb tips off, cut by saw.
85	July 28.....	Goderich Organ Co	"	Organs	—— Kneeshaw	.....	Tip of finger cut off by buzz planer.
86	December 8....	E. Leonard & Sons	London	Machinery	Thos. Maitland.....	.....	Four fingers cut off with circular saw.
87	" 15....	Toronto Radiator Co. (Ltd)	Toronto . ..	Radiators	W. Arkson.....	....	Foot badly burned by molten iron.
88	" 26....	Geo. Sleeman	Guelph	Beer	Jos. Messner	.....	Burnt } Were shellacing inside of large
89	" 26....	" "	"	"	Al. Schwinn	.....	Burnt } cask. The fumes ignited, causing explosion.
90	" 28....	Massey-Harris Co. (Ltd).....	Toronto . ..	.....	Jos. Marhman.....	.....	Placed his hand under the spring used to hold down the work; plank being sawn became unfastened against spring, severely tearing ball of thumb.

* Fatal.

BINDING AUG 23 1967